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THE DIAGNOSTIC SIGNIFICANCE OF THE DIFFERENTIAL CELL COUNT OF THE STERNAL BONE MARROW*

S. P. LUCIA, M.D. *and* MARJORIE L. HUNT, M.P.H.

The significance of the differential cell count of the peripheral blood in general is no less important than that of the bone marrow except that in the case of the latter it is possible to have a finer definition of a greater number of cell types. However the advantage of greater definition is often overbalanced by the marked fluctuations qualitatively and quantitatively of the cells obtained from the marrow cavity. At best the bone marrow differential count offers corroborative evidence only, and rarely is it absolutely definitive of a specific clinical diagnosis.

Differential cell counts on peripheral blood are more accurate than those done on bone marrow for the following reasons: 1. The fewer numbers of immature cells in the peripheral blood simplifies the problem of cell classification, and 2. A sample of peripheral blood constitutes a representative portion of the total blood volume whereas a sample of bone marrow presents the cytologic changes of only a limited area of the marrow. The accuracy of the bone marrow differential cell count is dependent upon definite quantities of material aspirated from standardized areas, and a finer definition of cell types. The total numbers of cells counted increases the accuracy and predictability of any marrow differential count.

Stained smears from the sternal bone marrow might be collected from workers in different areas of the country whose techniques of collection are reasonably standardized. An experienced person might be entrusted to count and analyse these smears according to cell types and arrange the collected data by sex and age. Such a set of normal bone marrow smears could be held at a central office of the technicians' association, and on request be loaned to interested technicians, who would then have the opportunity to compare their counts and their criteria of differentiation of cell types with a standardized set. In this

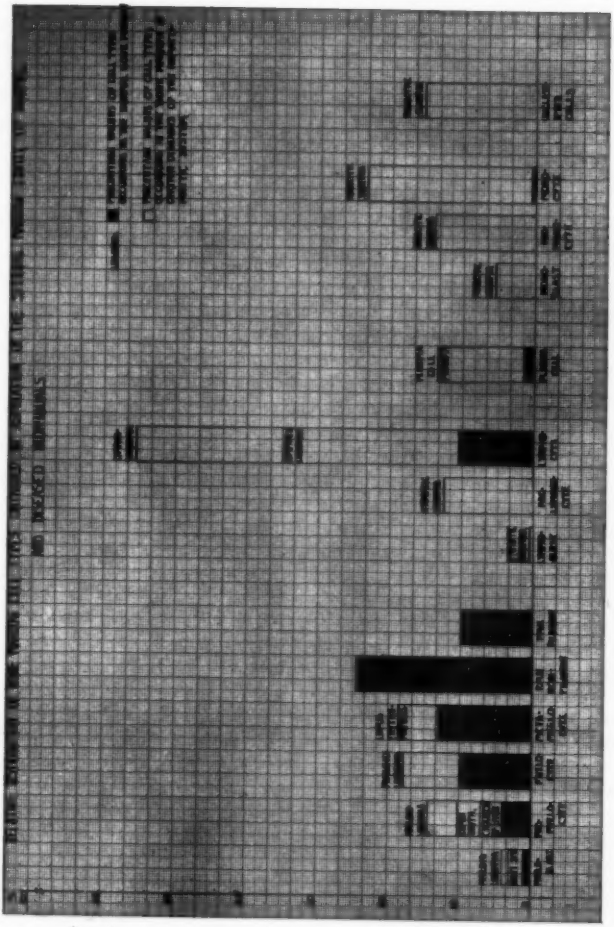
* Read before the A.S.M.T. Convention, San Francisco, June, 1946.

manner, uniformity of nomenclature, variations of normality, and significant deviations in disease could be realized.

Technique of sternal puncture and the preparation of bone marrow for examination: Samples of bone marrow may be obtained by puncture of the sternal marrow cavity in the midline at the level of the third rib. Less than 0.5 cc. of marrow pulp should be forcibly aspirated. Smears are made on cover slips, they are allowed to dry and then are stained with Wright's stain. Differential counts of not less than 500 marrow cells should be made from many suitable fields.

Criteria of cell types: a) *the myeloid series.* The classification by which cells of this series may be identified is that described by Naegeli, and further defined and catalogued by Kracke. b) *the erythroid series.* The descriptions of the cells of this series follow those given by Naegeli and by Kracke. The erythropoietic cells may be differentiated into the *megaloblast,* the earliest definable form of the erythroid series, the *erythroblast,* the intermediate form containing a "spoke wheel" nucleus, and the *normoblast,* the smallest form containing a dense pyknotic nucleus and hemoglobinized cytoplasm. c) the *lymphocytic, monocytic,* and *plasma cell* series may be classified according to the criteria set forth by Naegeli and described in detail by Kracke.

The interpretation of a bone marrow differential count must be referred to a set of standard *mean* values determined by a given observer on a series of normal individuals. Under the best of circumstances when a small amount of marrow pulp is forcibly aspirated and then examined, the differential count will give a quantitative approximation of the qualitative cytologic variation of the marrow from the aspirated site. The "normal values" for the various cell types as recorded by different investigators cannot be used as a baseline for determining the abnormal occurrence of cell types in the bone marrow because the technique of obtaining the specimen and the criteria of classification are not always comparable. The differences in actual numbers for the various cell types, as found in the literature, may be due to: 1. differences in nomenclature and definition of cell types; 2. the degree of dilution of the marrow pulp with blood; 3. nutritional and environmental changes to which the population under analysis is subjected; 4. statistical errors induced by small sampling; and 5. variations of chance. The mean normal values which are to be used as a baseline for determining significant deviations from the normal should be based upon as many normal specimens as possible and the cell classifications should agree favorably with data obtained from other observers whose techniques are comparable.



Clinical Interpretation of Bone Marrow Counts

In Table I is represented a graphic presentation of the bone marrow differential cell count in diseases which produce definite deviations from the normal. The data were obtained from a study of 159 cases of individuals who were diagnosed as having diseases involving the hematopoietic system.

These data may be summarized as follows: increases in the *myelocytic series* may occur in Banti Syndrome (myeloblasts), myeloid leukemia (myeloblasts, promyelocytes and myelocytes), cirrhosis of the liver (promyelocytes) and lupus erythematosis (promyelocytes). There will usually be no increase in polymorphonuclear non-filament cells and polymorphonuclear filament cells except in severe pyogenic infections or unless the bone marrow specimen contains excessive amounts of blood from the peripheral circulation; increases in the *lymphocytic series:* lymphatic leukemia (lymphoblasts, pro-lymphocytes, and lymphocytes) and lymphosarcoma (lymphocytes); increases in the *monocytic series:* in monocytic leukemia (monoblasts, promonocytes, and monocytes); increases in *plasma cells* in plasma cell myeloma; and increases in *primitive unclassified cells* in monocytic leukemia.

The ratio between leukocytes and nucleated red blood cells in the bone marrow in relation to various diseases involving the hematopoietic system is shown in Table II. The ratio for the normal group is 3.3 white cells to one red cell which agrees with Wintrobe's ratio of "3 or 4 to 1." Diseases showing active regeneration of white blood cells produce a high ratio of leukocytes to erythropoietic cells. Diseases showing active regeneration of red blood corpuscles show a decreasing ratio of white to red blood cells.

An analysis of 159 bone marrow differential counts from individuals diagnosed as having various diseases involving the hematopoietic system showed the following:

1. Significant deviations from the mean normal values were noted in myeloid, lymphatic, and monocytic leukemias, lymphosarcoma, plasma cell myeloma and in conditions causing active regeneration of erythropoietic tissue such as pernicious anemia, secondary anemia, and congenital hemolytic icterus.

2. Diagnostic significance may be attached to the presence of increased numbers of monocytes, megaloblasts, or plasma cells in material aspirated from the sternal bone marrow. These cell types occur so rarely in normal bone marrow that their presence, in all probability, indicates an important lead to the accurate diagnosis of the limited number of diseases in which they occur. A marked increase in monocytes and in primitive unclassified cells (histiocytes) occurs in monocytic leukemia; a similar increase in megaloblasts is diagnostic of pernicious anemia; appreciable increases in lymphocytes occur in lymphatic leukemia

TABLE II

The Ratio Between Leukocytes and Nucleated Red Blood Cells in the Bone Marrow in Relation to various Diseases Involving the Hematopoietic System

DIAGNOSIS	No. of Cases	WHITE BLOOD CELLS				Red Blood Cells	WBC/RBC
		Myeloid Cells	Lymphatic Cells	Monocytic Cells	Plasma Cells		
Diseases Showing Active Regeneration of White Blood Cells							
1. Monocytic Leukemia	3	22.0	6.8	43.3	3.4	6.5	75.5/ 6.5= 11.6
2. Myeloid Leukemia	7	82.1	2.1	0.9	0.5	10.4	85.6/10.4= 8.2
3. Leukemoid Reaction	4	68.3	15.1	0.3	1.3	12.8	85.0/12.8= 6.6
4. Lymphatic Leukemia	8	34.8	48.4	0.3	1.3	13.4	84.8/13.4= 6.3
5. Lupus Erythematosis	2	72.8	9.3	0.3	2.6	13.5	85.0/13.5= 6.3
6. Cirrhosis of Liver	3	75.0	6.5	0.7	0.9	15.0	83.1/15.0= 5.5
7. Lymphosarcoma	2	22.6	59.4	2.4	0	15.1	84.4/15.1= 5.6
8. Hodgkin's Disease	12	69.1	8.8	0.4	1.6	18.3	79.9/18.3= 4.4
9. Myelosclerotic Anemia	4	68.3	6.9	2.3	0.9	18.4	78.4/18.4= 4.3
10. Boeck's Sarcoid	4	71.0	4.8	0.3	0.6	19.6	76.7/19.6= 3.9
11. Dorso-lateral Sclerosis	4	68.7	7.8	0.7	0.8	20.3	78.0/20.3= 3.8
12. Plasma Cell Myeloma	7	33.1	21.3	0.7	13.6	20.4	68.7/20.4= 3.4
13. Normal	6	65.7	10.3	0.9	1.5	20.6	78.4/20.6= 3.3
Diseases Showing Active Regeneration of Red Blood Corpuscles							
14. Other Diseases, not Classified	15	67.5	6.2	0.3	1.2	23.5	75.2/23.5= 3.2
15. Hemorrhagic Anemia	5	63.2	8.6	0.6	0.7	24.6	73.1/24.6= 3.0
16. Polycythemia	3	63.0	7.0	1.7	1.0	25.5	72.7/25.5= 2.9
17. Thrombocytopenic Purpura	5	58.0	13.1	0.7	0.8	26.2	72.6/26.2= 2.8
18. Miscellaneous Anemias	8	58.1	11.8	0.6	1.0	26.4	71.5/26.4= 2.7
19. Splenomegaly	10	59.3	8.3	0.9	0.9	27.9	69.4/27.9= 2.6
20. Pernicious Anemia	7	59.2	7.4	0.2	0.7	29.8	67.6/29.8= 2.3
21. Anemias of Unknown Etiology	15	53.7	9.6	0.2	1.2	33.0	64.7/33.0= 2.0
22. Secondary Anemias	15	50.0	7.6	0.4	2.3	37.3	63.3/37.3= 1.6
23. Banti's Syndrome	3	46.5	10.8	0.8	0.8	39.0	58.9/39.0= 1.5
24. Hemolytic Anemia	3	43.2	9.6	0.1	2.0	42.8	54.9/42.8= 1.3
25. Congenital Hemolytic Icterus	4	43.5	6.0	0.6	0.4	48.5	44.5/48.5= 0.9

and in lymphosarcoma; and an incidence of plasma cells greater than 6% in the bone marrow may be considered diagnostic of plasma cell myeloma.

3. An increased number of normoblasts indicates stimulation of erythropoiesis but is not diagnostic of any specific disease condition.

4. An increase of eosinophiles occurs in the bone marrow in allergy, certain protozoan infestations, in the phase of repair following infections, and in diseases characterized by fibrotic alterations of the marrow such as Hodgkin's lymphosarcoma.

5. In myeloid leukemia there is a definite shift to the left of the early myeloid cell types—the promyelocytic cells showing the greatest change. These findings are confirmatory but not specifically diagnostic of myeloid leukemia.

Differential counts of material obtained by aspiration of the sternal bone marrow unfortunately does not give information which is definitely pathognomonic of disease entities involving

the hematopoietic system. This laboratory technique adds only corroborative evidence of the presence of a given disease and only in unusual circumstances can a definite diagnosis be made based purely on the cytologic changes in the bone marrow. Therefore, observations made on the cytologic alterations of the bone marrow in any given case must be interpreted in terms of the clinical findings.

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WHY IS THE BLOOD CO_2 VALUABLE IN DIABETES?*

RICHARD ALLYN, M.D.

In the management of a patient who has diabetes mellitus the carbon dioxide combining power of the blood plasma is frequently determined. Two questions are frequently raised concerning this: 1. What are the pathological physiological processes present in diabetes which cause alterations in the carbon dioxide combining power of the plasma? 2. What is the practical clinical application of this test in the treatment of diabetes?

In order to understand the significance of the carbon dioxide combining power of the plasma it is necessary to review briefly how some of the normal metabolic processes become altered in diabetes. When fats are utilized in the body they are present in the form of fatty acids, and in the normal breakdown (oxidation) of these fatty acids the oxidation occurs in a series of steps, with the oxidation process occurring at the beta carbon atom each time. This means that two carbon atoms are split off the fatty acid at a time, and that eventually the fatty acid will be completely oxidized into carbon dioxide and water.

However, in diabetes this process becomes disturbed, and the most generally accepted theory is that when the fatty acid has been broken down so that only four carbon atoms remain (this is butyric acid) ($CH_3 - CH_2 - CH_2 - COOH$), the normal oxidation processes do not continue any further, but instead abnormal breakdown products result from the butyric acid. The first product of this abnormal breakdown is beta-hydroxy butyric acid ($CH_3 - CHOH - CH_2 - COOH$) and following this is the formation of aceto acetic acid which exists in two forms. The "Keto" form is ($CH_3 - C{=}O - CH_2 - COOH$), and the "Enol" form is ($CH_3 - CHO{=}CH - COOH$). By the loss of CO_2 from these, acetone is formed ($CH_3 - C{=}O - CH_3$). These abnormal breakdown products of butyric acid are known as "ketone" or "acetone" bodies, and when they accumulate in the body a condition known as "acidosis" exists. The beta-hydroxy butyric acid and the keto form of aceto-acetic acid are both stable and relatively non-toxic, but the enol form of aceto-acetic acid is very labile and highly toxic.

A less generally accepted viewpoint is that of Stadie who believes that normally fatty acids break down all at once with the normal production of ketone bodies, but that their formation occurs so slowly that they can be oxidized as rapidly as they are formed. The difference in diabetes is that they are formed so much more rapidly that they cannot all be used up, and so

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accumulate and cause acidosis. The ketone bodies are thought to be formed in the liver and destroyed in the muscles, and it is only when their production exceeds their destruction that they appear in the urine. The acetone is either excreted in the urine or exhaled through the lungs.

When a condition of acidosis is present the body has several compensatory mechanisms which are immediately brought into action. Since the ketone bodies are what are known as "weak acids," some of them can be excreted directly into the urine as "free" acids, i.e., in a free or uncombined state, so that a highly acid urine results. Some of these acids, the ketone bodies, are also neutralized in the urine by being combined with ammonia and are excreted as ammonium salts, thus releasing more base to form more bicarbonate in the blood. Normally from 0.5 to 1.5 grams of ammonia are excreted in the urine in 24 hours, but in severe acidosis as much as 2-7 Grams of ammonia may be excreted in 24 hours. In the blood some ketone bodies can be absorbed without changing the pH by combining with the proteins in the blood and by displacing CO_2 from the bicarbonate in the plasma, the ketone bodies combining with the base of the bicarbonate and the liberated CO_2 being exhaled.

If more ketone bodies are present than can be accommodated by these previously mentioned means, they are excreted in the urine combined with fixed base from the blood, and especially large amounts of sodium may be lost from the blood into the urine in this manner. With this reduction of the amount of fixed base in the blood, the body attempts to compensate by withdrawing base from the tissues and tissue fluids elsewhere in the body. The end result of this is that the total amount of base and electrolytes in the body (blood plus tissues) may be greatly diminished. Next the body attempts to correct or compensate for this decreased electrolyte concentration by excreting additional amounts of fluid and thus attempting to restore the balance between electrolytes and fluids. However, even though the balance may be restored, the body has lost more base and electrolytes and more fluids than it should have, and the end results are: (1) a decreased total amount of fluids in the body, which is a state of dehydration; (2) a decreased amount of total base in the body, which is acidosis; (3) a secondary stasis of fluid in the tissues which in turn further decreases the amount of circulating blood; and (4) a depletion of the chlorides in the body because of the vomiting and diuresis which are so often present with acidosis, and possibly also because chloride is displaced in the blood by the oxybutyric anion and subsequently excreted in the urine as ammonium chloride.

The presence of acetone in the urine and a decreased plasma CO_2 combining power are suggestive of the presence of diabetic

acidosis but they are not pathognomonic of this condition. Acetonuria may be present in several other conditions, such as during fasting or starvation, or a diet unbalanced in carbohydrate and fat. Ketosis may appear when the ratio of calories of fat to carbohydrate is 9:1 or greater. Acidosis is also present in kidney disease, especially chronic nephritis (due here to retention in the blood of acid radicals such as phosphoric acid and sulfuric acid, and to decreased ability of ammonia to replace fixed base in the urine), in severe diarrhea due to loss of base through the intestines, in cyclic vomiting of children due to excessive amounts of ketone bodies being produced, and in quite a number of other more rare conditions.

In considering the clinical application of these facts one must remember that in acidosis there are concentration of the blood and dehydration of the entire body, frequently extremely severe. There is a shift of the blood pH toward the acid side (the amount of beta-hydroxy butyric acid in the blood has been recorded as high as 213 mg.%, and acetone may be present in as much as 135 mg.%; however, it is usually fatal if the acetone is greater than 70 mg.%). A depletion of the amount of fixed base and chlorides occurs both in the blood and in the body, and consequently there is a decrease in the plasma CO_2 combining power.

The determination of this relatively simple test for the plasma CO_2 can thus quickly give us an accurate guide to the severity of the acidosis and an estimation of the patient's prognosis prior to the appearance of symptoms of acidosis or the onset of diabetic coma. The normal values for the carbon dioxide combining power of the plasma (by the method of Van Slyke) are 55 to 70 volumes per cent. In mild acidosis the CO_2 is between 40 and 55 vol.%. Between 30 and 40 vol.% is a state of more severe acidosis, but it is a state in which there are frequently no clinical symptoms of acidosis present. Thus, if a plasma CO_2 is done and the CO_2 is found to be below normal, even though there are no clinical symptoms of acidosis present, appropriate treatment may be started much earlier than if one waited for clinical symptoms of acidosis to appear, and thus more serious acidosis or the onset of coma may usually be averted.

Besides being used to detect the presence of acidosis when it is present without clinical symptoms, and to determine the degree of acidosis when symptoms of acidosis are present (symptoms of acidosis are usually quite evident when the CO_2 is lower than 30 vol.%), the plasma CO_2 also serves as a very valuable index to the prognosis of the patient when coma is present, and also as a therapeutic guide in the efficacy of treatment of coma or acidosis. In one series of 463 cases of coma the average CO_2 was reported to be 11 vol.%. Coma is usually present when the CO_2

falls to 18-20 vol.%, and if the CO_2 is below 10 vol.% the condition is frequently fatal. In following the treatment of coma one should be guided by frequent CO_2 determinations, for if successive tests each show a greater CO_2 vol.% than the previous one, then the patient is known to be improving, while conversely if successive CO_2's show a falling CO_2 vol.%, then the acidosis is known to be deepening and the outlook of the patient's recovery is consequently less optimistic. These tests are particularly important when there are no other apparent changes in the depth of the coma.

A NATIONAL SORORITY FOR STUDENTS OF MEDICAL TECHNOLOGY

O. T. WALTER, Ph.D., *Supervisor, Pre-Medical Technology Course*
Macalester College, St. Paul 5, Minnesota

The profession of Medical Technology, though one of the younger members of the medical profession, is here to stay. During its short history of twenty-five years it has established itself figuratively and literally as the indispensable handmaiden of the medical profession. It has greatly facilitated and benefited the practice of clinical pathology and consequently raised the standard of medical practice. Since its pioneer days in the early twenties in the State of Minnesota it has taken root in every State of the Union, and it has experienced a healthy vigorous growth. Today approximately two hundred and fifty hospitals, colleges and universities in forty-one States are offering training courses in medical technology to nearly two thousand students.

Graduates from some of these institutions have organized the American Society of Medical Technologists, a strong organization and professional society dedicated to the maintenance of a high type of service, constant improvement of that service, and more efficient working conditions and facilities. Membership in this society is open only to properly qualified professional medical technologists. It is not open to the student preparing for the profession.

That there is a deep felt need for an undergraduate pre-professional society or sorority is evident from the fact that local societies have been organized on many college and university campuses. One of these societies has already organized as the Alpha Delta Theta national sorority. These students organized for mutual fellowship, promotion of a professional spirit, and the maintenance of high scholastic standards.

Since the purposes and objectives of the widely scattered local societies are practically the same, it seems quite desirable that all should unite into one national organization with all the attendant benefits of unity, strength, and wisdom pertaining thereto.

Following is a suggested plan of organization which can be modified and adapted to suit local conditions provided the modifications are within the framework of the major rules and regulations of the national group:

Purpose: The purpose shall be to unite into a common fellowship all worthy and well-qualified students of medical technology in fully accredited colleges and universities; to promote high standards of scholarship; to foster the spirit of inquiry; to insist on

intellectual honesty; to inspire increased individual effort; and to uphold the ideals of service.

Membership: There shall be two classes of membership, active and associate. Qualifications for active membership shall include academic standing of a first-semester sophomore; maintenance of a "C" average with demonstrated aptitude and proficiency in the pre-requisite basic sciences leading to the bachelor's degree; genuine interest in and aptitude for the profession of medical technology as evidenced by a pre-medical technology aptitude test;* good health; good social bearing; and high moral character; active participation in the activities of the society; prompt payment of regular fees and dues and any special assessments which may be voted by a two-thirds majority of the society.

Associate members shall be limited to those second semester freshman students who have expressed an interest in the profession of medical technology and who have the same scholastic and personal qualifications which apply to active members. Associate members may attend all social and program meetings, but they shall not have voting privileges.

Method of election: Prospective active and associate members shall apply for membership. Their names must be presented and endorsed by two active members in good standing. Voting shall be by ballot and by a three-fourths majority of the active members present.

Meetings and programs: These shall be local, regional, and national. The meetings and programs of a local chapter shall be of two types: 1) social and/or business meetings. 2) strictly program meetings of which there should be no less than eight throughout the academic year. Guest speakers may be secured for four of these program meetings, but for the purpose of self-development and self-expression two or more students should present papers at each of the other four meetings.

Regional meetings should be held once each year to present matters of interest to the sorority and to present progress reports.

National meetings shall be held bi-annually. These meetings should be informative, inspirational, and policy-making. Overtures and amendments presented by local chapters are to be reviewed and voted upon by the executive council and presented to the official delegates for enactment, by ballot, into the laws of the national sorority.

National Constitution: The constitution of the local chapters; methods of election of members and officers, initiation cere-

* Several past members of the Macalester College chapter of Alpha Delta Theta have prepared a preliminary pre-medical technology aptitude test. This could be amplified and used more widely by a national sorority.

monies; insignia; colors; and the symbolic flower shall conform to the pattern prescribed by the national organization, but may be modified or amended to conform to the rules of any particular college.

Since this organization is primarily for the undergraduate and pre-professional student on the college and university campus, it should be self-contained. However, since many of these students will shortly become professional medical technologists it would be highly desirable that an advisory relationship be established between the national sorority and the American Society of Medical Technologists, and that each local chapter shall have a sponsor from the American Society of Medical Technologists in addition to the regular faculty counselor or advisor.

Alumni membership is not suggested since it is assumed that upon graduation and registration with the Registry of Medical Technologists of the American Society of Clinical Pathologists each student, now having attained professional standing, will naturally wish to join that organization which seeks to promote the interests, standards and working conditions of the profession as a whole as the American Society of Medical Technologists is doing now.

Alpha Delta Theta, the present national pre-professional sorority, was organized jointly by chapters of Marquette University and the University of Minnesota respectively. It has high ideals, a carefully formulated constitution, and it is an active growing organization. The writer would recommend a thorough investigation of this society with a view to its formal recognition as the National Sorority for Students of Medical Technology by the American Society of Medical Technologists.

SUCCESSFUL BREEDING OF XENOPUS LAEVIS, THE SOUTH AFRICAN CLAWED TOAD-FROG

By STELLA B. CAMERON
Macdonald College, P.Q.

The early recognition of pregnancy has always been a matter of vital interest to mankind, but it was not until comparatively recently that it was put on a scientific basis. This resulted from the discovery that certain hormones are excreted in the urine of women during the first few months of pregnancy. It is true that the same (or very similar) substances are produced by certain other quite rare conditions, but these can be recognized by physicians and a diagnosis of pregnancy can be made with some assurance, provided the hormones can be demonstrated in the laboratory. There is no convenient test-tube method of demonstrating their presence and resource has been made to injections of various animals and to observing the reactions produced.

The first practical test on this plan was devised by Asheim and Zondeik, using young white mice. Later the same principle was adapted by Freidman to the rabbit. Both tests have been and still are, in widespread use in many parts of the world for the diagnosis of pregnancy. Various other modifications of this test have been employed at one time or another, with varying degrees of success, but the most important and most successful of all was that introduced by Professor F. E. Crew of Edinburgh about a decade ago. This employed as the test animal, the female South African Clawed Toad-Frog, *Xenopus laevis*.

This amphibian is unique: it is neither frog nor toad, although it has been called by both names. Actually, it is in a class by itself, its only near relation being the so-called Suranim Toad. It is the only amphibian suitable for demonstrating the presence of this particular hormone because an injection of a small quantity beneath the skin causes it to lay eggs at any time of the year. Under laboratory conditions, it does not lay eggs unless so injected.

The adult toad is about 3½ to 4½ inches long, with a smooth skin which is variously patterned—and like the Chameleon it possesses the ability to change color to a considerable extent, depending on the background. The normal color is a darkish green brown shade. The head is more or less triangular, the eyes without eyelids and the mouth without tongue or teeth; however, the jaw is provided with little ridges which enable food to be held but not chewed. The forelegs are small and used only to stuff food into the animal's mouth or to part water weeds; they are not webbed and so are not used for swimming. The hind legs, on the other hand, are massive with broadly webbed toes, which,

when spread out, are powerful swimming organs. The three inner toes are capped in horny, claw-like sheaths and are responsible for the popular name of "clawed" toad. The sexes are very similar in appearance. However, when fully developed the males are always smaller than the females, while the females may be distinguished by having three fleshy flaps closing the vent.

Both sexes are completely aquatic and never leave the water, even for feeding. Although they are fast and powerful swimmers, they prefer to rest in a nearly upright position with the tip of the nose just above the water. They are air-breathers but will die in a comparatively short time out of water. They have no gills and they must breathe air by resting as described or, during exercise or feeding, by rising to the surface, gulping air and then submerging again.

They are carnivores and feed on insects, fish, worms, shredded meat of various kinds and even their own eggs and young.

They stand captivity well, and there are records of their living in aquaria for over a decade. However, although the female ovulates continuously and stores the ova ready for extrusion in her oviduct, she never lays them in captivity, unless pairing with the male takes place or unless she is injected with a suitable hormone.

It is difficult to induce natural pairing in an aquarium but this was the first method used for propagation of the toad outside of Africa. The earliest attempts at breeding this frog were made in London at the Zoological Gardens by Beddard. He was almost immediately followed by Bles in Glasgow, Scotland, at the beginning of the century, who tried as far as possible to imitate natural conditions. In nature, pairing takes place in August (early spring in South Africa). Bles kept his frogs in summer at 80° F. and fed them well. He allowed the temperature to drop during winter (about 55° F. during the day and 40° F. during the night) and under those conditions the frogs hibernated. In spring the aquarium temperature was raised to 70° F. and each morning and evening some water was drawn off, cooled and sprinkled back in a fine spray to simulate rain. Under this treatment pairing took place and several thousand fertile eggs were laid. Few attempts were made to breed *Xenopus* again until Hogben and his colleagues showed the effects of hormone injection, and Crew drew attention to its practical value as a test animal. The response of the female to the injection of the hormone suggested that injection of the hormone into the male simultaneously with the female, might induce pairing, and the laying of fertile eggs. Various workers, commencing with Shapiro in South Africa, used this technique and successful breeding resulted.

In the spring of 1943 the writer's first attempts at breeding these frogs were started.

A tank holding about half-a-gallon of water, with stones and water plants, was prepared. The male and female were injected with a positive urine and eggs were laid; only four hatched and three of these died after about five days. The fourth survived. The fact that even one survived was encouragement enough to try again. A week later another tank was prepared. This time the plants were omitted; only stones, sand and algae were put into the tank. About 50 tadpoles survived from this spawning.

Each week another pair was injected. The stones were removed altogether as it was found that although some eggs were laid on the stones, etc., the female would often get in between the glass and the stones and the male was unable to get close enough to fertilize the eggs. Finally the sand was omitted as it was found that the male and female swimming about stirred up the sand which would cover most of the eggs, with the consequence that many did not hatch.

As soon as the eggs were laid and the frogs separated, the male and female were removed to resting tanks and algae added to the tank containing the eggs. A tumblerful of algae was added each day. When the tadpoles were about five days old Ramshorn snails (*Helisoma* sp.) were also placed in the tank. Under this treatment a low mortality was noticed but metamorphosis was very slow, taking from 12 to 16 weeks.

Various techniques were tried but the one in use at present is definitely producing the greatest number of frogs.

Ten gallon tanks are used (12″ x 18″ x 10″ high). These are filled with unchlorinated, clean water to a depth of about 3″; the temperature of the water is kept about 75° F. A wire grid, ¼″ mesh, with the sides turned down to allow 1″ clearance at the bottom is inserted in the tank (care must be taken to ensure that this fits tightly so that the male or female cannot get underneath the grid; being unable to come up to breathe they will be dead in the morning). The male frog is injected with the hormone and put into the tank. About two hours later the female is injected and placed beside the male. Another wire grid is put over the top of the tank to prevent them jumping out, and paper or cardboard is placed around the tank to cut down the light. They should be kept as quiet as possible in a warm place to keep the water at about 70 to 75° F. The next morning they are almost invariably still together but will often separate at once if one looks into the tank. However, one pair remained together for four days and did not separate until taken out; even then considerable leverage was necessary to unlock the male. We have also taken them out still in amplexus and put them into a tank together, but although they have not separated for several hours,

no more eggs were laid. If the frogs are not removed from the tank the water becomes foul with faeces by the next morning, and the eggs, although obviously fertile, die at the hatching stage.

The growth of the frog is remarkable. The first stage is reached within forty-eight—often thirty-six—hours of the egg being laid. Then a tiny fish-like creature leaves the egg and by means of a little filament from its head, attaches itself to stones, the iron-grid, the side of the aquarium or even the surface film of the water. There it remains for three days to a week feeding on the yolk of the original egg and gradually changing to a true free-swimming tadpole when it detaches itself from its filament and starts to feed on organisms in the water. These are usually unicellular plants but in captivity substitutes may be used with advantage. The tadpole resembles a miniature catfish with a broad, wedge-shaped head, with long tentacles. The body is long and pointed backwards and there is a large fin. This stage tadpole can move actively, but usually lies stationary in the water, with its finfold continuously moving, and continuously gulping water to strain off the microscopic food particles from it. Very shortly it becomes an air breather and rises continuously to the surface to gulp air, returning to midwater to continue feeding.

This stage lasts for several weeks, during which the tadpole grows. In due course, the limbs appear. The hind legs appear first, and are followed sooner or later by the fore limbs.

At about the twelfth week of its life the final metamorphosis takes place and the tadpole becomes a tailed frog. There is a sudden transformation of the head from the almost transparent basket-like structure of the tadpole to the smaller, opaque head of the frog. There is an equally sudden change in diet from a plankton-eater to a carnivore. The tail is absorbed and the young frog takes on its final shape. It requires about two years longer, however, before it has grown to its full adult size and becomes sexually mature. Occasionally the adult stage has been reached in less than two years but this is the exception rather than the rule.

About the fourth day, clean water at the same temperature as that of the tank is gently added. Each day more is added until it is about 1" from the top of the tank.

About the sixth to eighth day, when the head has developed and the tadpole is in a horizontal position, a very small amount of pulverized dried liver is added to the water. On the tenth to twelfth day a piece of glass is gently scraped across the bottom of the tank and the infertile eggs and debris are then easily syphoned off. As soon as the bottom of the tank becomes cloudy or dirty it must be scraped off. As the tadpoles increase in size,

a larger amount of liver is added each morning—but not sufficient to cloud the water. It is a matter of judgment and observation to decide the correct quantity of liver to be added; this depends on the number of tadpoles in a tank and their size.

With the temperature of the water at about 70° F. and feeding with the ground liver, tadpoles have metamorphosed at about five to six weeks, although some in the same tank may take 12 weeks. After the first appearance of the hind legs, it takes about three weeks before any sign of the front legs is observed.

On completion of metamorphosis the small frogs are removed from the tank with a bolting silk net and placed in a tank containing tap water to a depth of about 1".

The small frogs are fed ground beef heart. It is essential that this should be minced very fine or many deaths will occur through choking. The frogs are fed every morning and all tanks are cleaned before and about four hours after feeding.

Once the tadpoles have metamorphosed the death rate is very low. Frogs about the same size should be kept together; one hundred small frogs can be put in a ten-gallon tank, as already described. As they grow the number of frogs in the tank should be decreased; no more than eight fully grown frogs should be put into such a tank.

Following this technique, the first female bred in Canada (referred to above) was injected at two years of age and paired with a slightly younger male, also injected. She laid over 3,000 fertile eggs and 2,633 tadpoles survived from this one spawning.

The care and feeding of the adult frog is quite a simple routine, but it should be a routine and not a haphazard job. About six to eight adult frogs are kept in a ten gallon tank containing water about 3" deep. This depth allows the frog's hind legs to rest on the bottom of the tank with its nose above the water in order that it may breathe. It will stay in this position for some time, quite motionless, but will dash frantically round the tank if disturbed by any one looking into the tank. The temperature of the room should be about 70° F. to 80° F. The adult frog is fed twice a week and its diet consists of minced beef heart from which all gristle and fat are removed before mincing; garden worms and liver are also much appreciated. The tanks are cleaned before feeding and care should be taken to replace the stale water with clean of about the same temperature. The minced heart is put into the tank and separated in the water as otherwise the frogs scoop more food into their mouths than they can swallow and choke themselves. About two heaped tablespoonsful of minced heart are sufficient for eight frogs. This should be increased or decreased according to the amount left in the tank at cleaning time. The frogs are fed at ten a. m. and

cleaned about four p. m. The meat may be left in the tank overnight but should be cleaned out first thing in the morning. If the frogs are to remain healthy the water must not be allowed to become foul.

The tanks should be placed in such a position that they get a certain amount of sunlight during part of the day. If the tank is too sunny all the frogs will cluster in one corner where there is any shade at all. In a large tank 9′ by 6′, containing about six hundred frogs 12 to 18 months of age, a cover is put over one side of the tank to make shade; by doing this the frogs will use the whole of the tank and not congregate in one corner.

Care in handling the frog is very important. The hand is placed over the animal with the head of the frog pointing towards the palm of the hand. The first finger is then placed between the frog's hind legs and the thumb and second finger in front of the legs with the remaining fingers curled under the body. Only practice will denote how much pressure is required to hold it captive. The frog should not be lifted clear of the tank until one is sure that it is held firmly. Should the frog leap to the floor it is suggested that a damp towel be thrown over it, as this is the quickest and simplest way of recapturing it. Only those who have experienced the mad scramble on the floor to retrieve a frog will realize how quickly they can jump.

The Test and Injection

It is to be remembered that this test, while called a Pregnancy Test, actually indicates the presence of the hormone found in the urine of women during a certain period of pregnancy. It has been found from 12 days after the first missed period up to 4 months; later than this it gradually disappears. Usually the maximum amount of hormone is found between the sixth and eighth week, but is almost invariably present at 20 days. This has been the writer's experience although it has been found earlier and later by other workers with this test.

For the test, the writer uses two adult frogs. They should not be fed prior to injection for at least one day in order to prevent the frog regurgitating and fouling the water. The frogs are placed in a small tank 12″ by 6″ by 6″ deep. A wire grid, as previously mentioned, is placed at the bottom of the tank and another over the top; 2½ to 3″ of water is put in the tank at 72° F.

The urine sample should be an early morning one. No drugs (including aspirin and quinine) of any description should be taken by the donor for at least 24 hours before giving the sample, as these are very injurious to the frog and death almost invariably results from the injection.

Various workers use various means of preparing the urine and different amounts of it, but the writer has found the following technique simple and fully satisfactory.

To 70 cc. of early morning urine add 140 cc. acetone.

Stir and allow to settle for 15 to 30 minutes.

Pour off most of the supernatant, leaving a few ccs. of the fluid with the precipitate.

Stir with a wooden applicator and pour into a 15cc. centrifuge tube. Spin for 4 minutes, discard supernatant and dry until all smell of acetone has disappeared. This precipitate contains A.P.L., protein, phosphates, etc. Add to it 3 cc. distilled water and stir with applicator.

The suspension is then centrifuged for about 3 minutes. The supernatant now contains the A.P.L. It is poured carefully into a watch glass and acidulated to a pH of 5.5 with 10 per cent solution of sulphosalacylic acid, using nitrazine paper. If it is over acidulated, 10 per cent carbonate may be used to adjust it to a pH of 5.5. The solution must not be alkaline.

1.5 cc. of this fluid is injected subcutaneously into the back of the frog, just in front of the hind leg, using a small glass hypodermic syringe and a No. 25 needle about 5/8" long. The point of the syringe should be directed backwards to avoid puncturing the lungs and care should be taken that it is inserted subcutaneously.

The procedure is repeated with the second frog and both placed in the same aquarium tank. It is strongly recommended that two people do the injection. After capturing the frog it should be held in a damp towel without releasing hold of it. The assistant should then hold the hind legs with the towel while the one holding the frog, folds the towel over it and then holds it with the left hand, leaving bare the part of the frog to be injected. Less jerking of the frog makes for easier injection and safety to the frog.

The injections are best made in the late afternoon and the results read the following morning. A single egg from either frog is positive but usually several hundreds are laid. If no eggs are present the frogs are left until the afternoon, by which time there will occasionally be some eggs laid, but almost invariably they are present in the morning. Absence of eggs is almost certainly negative if two frogs are used, but if necessary, the test can be repeated on two other frogs.

Frogs giving negative reactions may be used again after a week's rest, but then should be given one month's rest. Positive frogs must have a month's rest before they are used again. With this proviso, they may be used indefinitely up to 10 to 14 years.

EDITORIAL

I had such a helpless feeling the other day—when disaster struck Texas City. With the immediate reaction that everyone has at such a time, I wondered what *I* could do to help. The call was out for doctors and nurses. What could the medical technologist do at such a time? Surely there was some place for his training in such an emergency. He, too, should have been able to offer his services at a moment's notice.

Plasma was rushed to the site of the disaster. Every hospital in neighboring cities and towns was swamped with would-be blood donors to help the estimated hundreds of burn and explosion victims. The Naval Hospital sent word to the two local colleges to have available any ex-service men who had had laboratory experience. Two teams of technologists went from one of the hospitals, prepared with equipment for blood typing, and offered their assistance at a blood bank in a smaller neighboring city. This was refused. The announcement was made over the radio of "an unusual activity of students from the University of Texas College of *Dentistry*. These young men have set up a blood typing service right here at the scene of disaster." An offer was made by the Harris County Society of Medical Technologists to the Red Cross headquarters to the effect that some twenty or thirty of its members would be available to help the regular personnel in the hospital blood banks. There was no request for those services.

Why? The medical technologist is a trained person. Certain of his skills were of distinct value in this case. The need was there. What can we do in such a case to make our skills more available? Was the fault ours? Should we have rushed in and taken the initiative? Or is it just that the need for a trained person to type blood and to perform other of the details of transfusion work, is not appreciated by those in authority?

R. M.

P. S. A few of us were allowed to help in one of the local hospitals, but it was so little in the face of what we could have done!

ABSTRACT

Albers, Donald D.: Diagnosis of Diphtheria. *U. S. Naval Medical Bull.* Vol. 47, 33, (Jan.-Feb.) 1947.

A modified Douglas medium is described:

Trypticase (available commercially)	20 gm
Sodium Chloride	5 gm
Dextrose	2 gm
Agar	20 gm
Distilled Water	1000 ml

Adjust these ingredients to pH 7.4 to 7.6 and autoclave at 15 pounds for 15 minutes. When cooled to about 50° C., add the following and pour into plates:

Potassium Tellurite, sterile 1%	10 ml
Serum, sterile	50 ml

The author states: "On this medium organisms produce colonies with dark gray raised centers and lighter peripheral zones. In 18 to 24 hours the size varies from about 0.5 to 2.5 mm., the *gravis* being largest and *intermedius* smallest. Later the *gravis* takes on the typical rough appearance. . . . Contaminating organisms which also produce dark colonies are usually staphylococci, diphtheroids, and micrococci . . . It is felt that using clear tellurite medium made with serum instead of whole blood allows much better colony study."

For laboratory diagnosis of diphtheria, the following procedure is given:

ACUTE CASES:

1. Inoculate a tellurite plate, blood agar plate, and Loeffler's slant with a swab or loop. (This should be taken by the medical officer from beneath the membrane, if possible). Observe the blood plate for evidence of hemolytic streptococci and the tellurite plate for typical colonies in 18 to 24 hours. When suspected colonies of *C. diphtheria* are found, make methylene blue stains from a colony and the emulsified surface of the Loeffler slant. Report the presence of organisms morphologically typical of *C. diphtheria.* The blood plate will rule out streptococcal infections which may be confused or occur simultaneously. Hold the tellurite plate 48 hours before discarding as negative.

2. Prove virulence of the organism only when special indication exists.

NON-ACUTE CASES:

1. Proceed as in No. 1 for acute cases, omitting the blood plate.

2. When a suspected organism is found, isolate in pure culture, grow in broth, and proceed with one of the virulence tests. When virulence tests can not be done—

3. Inoculate the organisms into the sugars, glucose and sucrose.

Fermentation of glucose but not sucrose indicates *C. diphtheria*. Cultures should be held one week unless acid is produced earlier.

4. Type the organism biochemically according to the criteria of Anderson et al, only in special studies.

The Chick Virulence test is described:

Sickness and death of the chick usually occur in 3 days. Chicks ranging in age from 7 days to 8 weeks are satisfactory. The injection of 2 cc. (up to 5 cc. in older chicks) of a 48 hour broth culture is made subcutaneously over the attachment of the right wing. Controls are produced by injecting 1 to 3 hours previously 500 units of diphtheria antitoxin in the same site that is to be used later for injection of organisms. In many cases chicks can be obtained when guinea pigs or rabbits may not be available. Moreover, chicks have the advantage of being easily handled by one person.

BOOK REVIEWS

HENRICI'S MOLDS, YEASTS, AND ACTINOMYCETES. A Handbook for Students of Bacteriology. By Charles E. Skinner, Ph.D., Assistant Professor of Bacteriology, University of Minnesota; Chester W. Emmons, Ph.D., Principal Mycologist, Division of Infectious Diseases, National Institute of Health; and Henry M. Tsuchiya, Ph.D., Research Associate, Division of Microbiology, Hormel Institute, University of Minnesota. Second Edition. 409 pages, 5 tables, and 136 figures. New York. John Wiley & Sons, Inc., 1947. Price $5.00.

The recognition of fungi as agents of disease is one of the major present day medical problems. How do the pathogenic fungi look in culture and tissues? How are they cultured and differentiated? How are fungi studied? How are fungi classified? These and many more timely questions are answered in this book.

There are 14 chapters which survey the field as follows:

I. THE STRUCTURE AND CLASSIFICATION OF THE FUNGI: Position of Fungi in the Plant Kingdom; Mycelium; Cells of Fungi; Oidia and Yeast-like cells; Spores; Dikaryotic Mycelium; Homothallism and Heterothallism; Heterogamy and Isogamy; Badisiomycetes, Ascomycetes and Phycomycetes; Life Cycles of Representative Fungi; Key to Classes and Subclasses of Perfect Fungi.

II. VARIATIONS IN THE LOWER FUNGI: Pleomorphism or Degeneration; Microbic Dissociation; Sectors and Secondary Colonies; Induced Variations; Variations in Infection; Variations in Morphology and Physiology; Reversible Variations; Genetics of Fungi; Practical Considerations; Relation of Variations to Taxonomy.

III. METHODS FOR STUDYING MOLDS, YEASTS, AND ACTINOMYCETES: Culture Media; Isolation of Fungi; Methods of Study of Physiological Taxonomic Characters of Yeasts; Giant Colonies; Morphology; Slide Cultures; Examination of Tissues and Exudates.

IV. MOLDS BELONGING TO THE PHYCOMYCETES: Entomophthorales; Families of Mucorales; Important Genera.

V. MOLDS BELONGING TO THE FUNGI IMPERFECTI AND THE ASCOMYCETES: Position of Fungi Imperfecti; Nuitlemin's Classification; Saccardo's Classification; Aspergillus; Penicillium; Cladosporium and Black Yeasts; Other Genera of Fungi Imperfecti; Neurospora.

VI. FUNGUS DISEASES OF MAN AND ANIMALS—GENERAL CONSIDERATIONS: Types of Mycoses; Host Specificity; Sensitization; Histology; Toxins; Immunty Reactions; Serology; Allergies; Skin Testing; Asthma; Treatment.

VII. INFECTIONS CAUSED BY MOLDS: Coccidioidomycosis; Dermatophytosis; Dermaphytes; Key to Principal Species; Principal Types of Dermatophytosis; Saprophytic Skin Fungi; Blastomycoses; Histoplasmosis; Sporotrichosis; Chromoblastomycosis; Phialophora; Aspergillosis; Mycetoma.

VIII. BIOLOGICAL ACTIVITIES OF MOLDS: Ecology of Molds; Nutritional Requirements of Molds; Mold Fermentations; Metabolic Products; Mold Enzyme Preparations; Use of Molds in Food Products; Mold Spoilage; Molds in Textile and Wood Products.

IX. MORPHOLOGY AND CLASSIFICATION OF THE YEASTS AND YEAST-LIKE FUNGI: Asexual Reproduction: Sexual Reproduction; Cytology; Classification; Genera of Endomycetaceae; Species of Saccharomyces; Other Genera of Perfect Yeasts; Families and Genera of Aporogenous Yeasts; Species of Cryptococcus; Candica; Geotrichum; Sporobolomyces; Rhodotorula; Other Genera of Imperfect Yeasts; Discussions of Nomenclature.

X. PATHOGENIC YEAST-LIKE FUNGI: Occurrence of Saprophytic and Pathogenic Yeast-like Fungi in Man; Cryptococcosis; Moniliasis.

XI. BIOLOGICAL ACTIVITIES OF YEASTS: Ecology of Yeasts; Nutritional Requirements of Yeasts; Manufacture of Yeast and Its Uses; Industrial Applications.

XII. CLASSIFICATION, MORPHOLOGY, AND BIOLOGICAL ACTIVITIES OF THE ACTINOMYCETES.

XIII. ACTINOMYCOSIS: Etiology; In Lower Animals; In Man; Mycetoma pedis; Acid-fast Actinomycetes.

XIV. ANTIBIOTIC SUBSTANCES: Penicillin; Streptomycin; Miscellaneous Antibiotic Substances.

The concise descriptions of pathogenic fungi, the detailed methods given for culturing fungi, and the profusion of illustrations throughout the book make this volume a real contribution to mycology.

This book is especially recommended to schools of medical

technology as a supplementary text to their instruction in bacteriology and, also to those technologists who need a mycology handbook.

PRACTICAL PHYSIOLOGICAL CHEMISTRY. By Philip B. Hawk, Ph.D., President, Food Research Laboratories, Inc., and Bernard L. Oser, Ph.D., Director, Food Research Laboratories; and William H. Summerson, Ph.D., Associate Professor of Biochemistry, Cornell University Medical College. 12th edition. 1323 pages, 314 figures. Philadelphia and Toronto: The Blakiston Company. 1947. Price $10.00.

The bringing of this text up-to-date makes this a most welcomed new edition. The fact that biochemistry is passing through a period of transition in its use of the various instruments, has necessitated a complete revision and re-writing of this text. No change has been made in the sequence of presentation of the subject matter.

Chapter 23 on blood analysis is the outstanding chapter of the book. The principles of colorimetry and photometry are explained in detail in a manner which is understandable. The various protometric instruments are pictured and diagrammatic drawings are used to show how a given instrument works. Methods applicable to both colorimetric and photometric instruments are given. Many new methods especially adapted to the photo-electric cell have been added; older and more obsolete methods have been omitted.

New sections in the book include: The polarograph, newer data on isotopes, sulfa drugs, metabolic antagonists, antobioytics, the Warburg tissue-slice procedure, electrophoretic fractionation of plasma proteins, compositions of foods, and the chemical importance of the vitamins.

The appendix has been greatly enlarged and includes sections on reagents and solutions, useful information on acids and alkalies, composition of foods, recent data on the vitamin B complex as found in foods, accessory nutritional data on foods; 1947 international atomic weights, analysis of variance, and the maintenance of animals for nutritional experiments. This book ranks with those references which are essential and should be found on the bookshelf of every clinical laboratory and in the library of every school of medical technology. The chapter on blood analysis is one of the contributions of the year to the practice of medical technology in the field of clinical chemistry.

LESSONS IN PHARMACEUTICAL LATIN AND PRESCRIPTION WRITING AND INTERPRETATION. By Hugh C. Muldoon, Dean of the School of Pharmacy, Duquesne University. Fourth Edition, 256 pages. New York; John Wiley and Sons, Inc., 1946. Price $2.50.

This is an up-to-date Latin primer for pharmacists. The approach to the subject is basic and direct; the style is simple and straightforward. Persons who are interested in understanding the basic principles pertaining to drugs and prescriptions and,

the application of Latin names to drugs will find in this little volume a wealth of information.

PENICILLIN IN SYPHILIS. By Joseph Earle Moore, M.D., Associate Professor of Medicine and Adjunct Professor of Public Health Administration, The Johns Hopkins University; Physician-in-Charge Spyhilis Division of the Medical Clinic and Visiting Physician, The Johns Hopkins Hospital; Chairman, Syphilis Study Section, National Institute of Health, United States Public Health Service; Chairman, Subcommittee on Venereal Disease; National Research Council. 319 pages; 52 tables; 57 figures. Springfield, Illinois: Charles C. Thomas. 1947. Price $5.00.

This book is exclusively for clinicians; no techniques are given for the serological diagnosis of syphilis. The volume presents the accepted knowledge concerning the use of penicillin in syphilis to date. The chapters on the chemistry of penicillin and the pharmacology of penicillin are well worth the time required for reading them as they present the possibilities and limitations of this antibiotic. Each chapter has a full bibliography.

A HANDBOOK OF COMMONLY USED DRUGS. By Michel Pijoan, B.A., M.D. Director, The Chemical Foundation Laboratory, The University of Colorado, Formerly Lieutenant Commander, M.C. (S) USNR Naval Medical Research Institute, Bethesda, Maryland, and Clark Harvey Yeager, M.D., Dr. P.H., Chief of the Medical Sections, Health and Sanitation Division, Office of Inter-American Affairs, Washington, D. C.; Lecturer on Tropical Diseases, The Johns Hopkins Medical School and the University of Maryland School of Medicine. 198 pages. Springfield, Illinois: Charles C. Thomas. 1947. Price $3.75.

This little book grew out of the notes which the authors used in World War II. Drugs are classified according to usage, and the formulae, dosage and pharmacology is given. The chapter on agents used to combat infectious disease is exceedingly well presented. Perhaps the most outstanding chapter of all is the one on the treatment of some of the common diseases peculiar to subtropical and tropical areas of the western hemisphere. In this chapter the recognition, transmission, treatment and prevention of a disease is given. The presentation of the commonly used antibiotics is brief but to the point.

GYNECOLOGICAL AND OBSTETRICAL PATHOLOGY. By Emil Novak, A.B., M.D., D.Sc., (Hon. Dublin) F.A.C.S., Associate in Gynecology, The Johns Hopkins Medical School; Gynecologist, Bon Secours and St. Agnes Hospitals, Baltimore; Fellow American Gynecological Society, American Association of Obstetricians Gynecologist and Adbominal Surgeons, Southern Surgical Association; Honorary Fellow, Societe Francaise de Gynecologie; The Royal Institute of Medicine, Budapest; Sociedad d'Obstetricia et Ginecologia Buenos Aires; Central Association of Obstetricians and Gynecologists; Texas State Association of Obstetricians and Gynecologists; Past Chairman, Section on Gynecology and Obstetrics, American Medical Association. Second Edition. 570 pages, 542 illustrations, 15 in color. Philadelphia and London: The W. B. Saunders Company, 1947. Price $7.50.

This book needs no introduction to the pathologist, gynecol-

ogist, and obstetrician. The profusion of illustrations throughout enhance the value of the volume to physicians. No pathological techniques are given, but a tissue technician can glean quite a bit by studying the various illustrations of pathological sections. Ovarian tumors are classified in a short outline, which makes a quick reference possible.

In the opinion of the reviewer, this volume should bridge the gap between the pathologist and the practicing gynecologist.

ALLERGY IN THEORY AND PRACTICE. By Robert A. Cooke, M.D., Sc.D., F.A.C.P. Attending Physician and Director of the Department of Allergy, the Roosevelt Hospital, New York City. In Association with Horace S. Baldwin, Robert Chobot, R. Clark Grove, Joseph Harkavy, Selian Hebald, Michael Heidelberger, Paul Klemperer, Louis Schwartz, W. C. Spain, Dudley D. Stetson, Albert Vander Veer, Mathew Walzer, Margaret B. Strauss. Philadelphia and London: W. B. Saunders Company. 1947. 572 pages, 43 figures. Price $7.00.

Although written for the allergist, the technician doing allergy testing will find this volume a most welcomed edition. A historical survey is made of the subject which is followed by descriptions of the various forms and types of allergies. The book is divided into nine sections as follows:

Section 1. Fundamental Aspects of Allergy.
Section 2. Allergy of the Bronchii.
Section 3. Allergy of the Upper Respiratory Tract.
Section 4. Allergy of the Skin.
Section 5. Allergy of the Nervous System.
Section 6. Allergy of the Cardiovascular System.
Section 7. Allergy in Relation to Other Specialties.
Section 8. Allergens in Relation to Diseases of Allergy.
Section 9. Technics.

There are 54 pages devoted to technics of skin testing and the preparation of extracts and antigens. Technics for scratch tests, intracutaneous tests, and group testing are given. Grades of reactions, descriptions of reactions and technical errors are also discussed. The technics used in preparing allergenic, mold, milk, horse serum, oil, and miscellaneous extracts are included and methods for the cleaning and sterilization of equipment are described.

The fact the allergy is a part of the science of immunology should stimulate a wider interest and deeper understanding of this subject among technicians, for allergy is no longer an observed phenomenon of idiosyncrasies, but a systematic study of the immunological, pathological, bacteriological, and chemical phases in their clinical applications. The author and collaborators of this book have presented the outstanding features of the subject of allergy for the allergist, and have included a section on technics which should find great favor among the technicians performing allergy tests.

BOARD OF DIRECTORS

Miss Henrietta Lyle, who has attended all except the organizational meeting of the A.S.M.T., and the convention at Excelsior Springs, Missouri, was one of the technologists who answered the first questionnaire sent out by the A.S.C.P. prior to the organization of the Registry. She was one of the first registered medical technologists. Her laboratory training was at the Temple University Hospital, following which she worked under the direction of Dr. R. A. Kilduffe at the Atlantic City Hospital for two years. Since that time she has been with the St. Joseph's Hospital, Lancaster, Pennsylvania. Besides serving on nearly every committee in the A.S.M.T. at one time or another, Henrietta was president of the organization in 1940-1941. After that she was elected to the Advisory Committee where she served from 1941-1946. In June, 1946, she was elected to the Board of Directors for her three year term. She is serving as president of the Pennsylvania Society of Medical Technologists and Laboratory Technicians at the present time. Miss Lyle is a person whose advice can always be relied upon. Her level-headed suggestions have always been for the best interests of medical technology and those engaged in the profession.

Rose Matthaei, sixth member of the Board of Directors, and editor-in-chief of the A.J.M.T., received her degree from the Rice Institute, Houston, Texas. Her training was received in the Memorial Hospital Laboratory of that city, after which she was employed in the Jefferson Davis Hospital Laboratory. Following this she spent several years as a field malaria technologist and in other branches of public health laboratory work. For the past four years she has been employed in the laboratory of Dr. A. H. Braden. From the beginning of her career as a medical technologist, she has been actively interested in the Harris County, the Texas, and the American Society of Medical Technologists, and at present is looking forward to seeing them as a unit of professional membership. She has held several offices in each, having completed a two year term as president of the A.S.M.T. on June 30, 1946.

Miss Lyle and Miss Matthaei have two more years to serve on the Board of Directors.

YOUR INVITATION TO DENVER

Dear Fellow Members:

I am pleased to report that as a result of the competent direction, diligent and cooperative efforts of our Executive Secretary and all the members of the Convention Committees, the stage is set for our Fifteenth Annual Meeting in Denver, Colorado, on June 30th, July 1st and 2nd with headquarters at the Shirley Savoy Hotel.

As you will read in the pages of this Journal, the Programme Committee has planned a varied scientifc programme—with the inclusion of eminent pathologists, who by their presence will stimulate our interest in various phases of medical technology and likewise will increase our knowledge by what they have to tell us; also medical technologists will give us reviews of actual experiences occurring in the conduct of their professional pursuits. In addition, in reply to numerous requests, several panel discussions have been organized.

The Exhibits, both scientific and technical, provide the opportunity (A) to see how talented some of our fellow members are in setting up displays which represent accounts of special projects in which they have engaged. (B) by visiting the technical exhibits, you will see and hear about currently used laboratory equipment and possibly some newly developed models to work with. A rather unique attraction of this section, to which the Colorado members are contributing, will be a "Hobby Show," comprising of "collections" connected with the medical profession which are expressions of medical technologists' hobbies.

The Entertainment Committees are offering an array of attractive and interesting events. One of these will be in typical Western fashion—at the Red Rocks.

The Local Arrangement Committee has most adequately taken care of all details even to appointing several special committees for various extra duties. One of these, will be our hostesses at the Informal Reception at Convention headquarters on Sunday evening, June 29th. Another Committee has been assigned to welcoming and directing the incoming members and guests at Union Station. With frequent communications from the Colorado members, I can assure you that they are exerting every effort to make our visit to Denver an interesting and pleasant memory for years to come.

May I remind each of you, that every State is afforded the opportunity of having voice in the deliberative assembly of your national organization which meets annually at convention time. An important item of business for the House of Delegates Session

in Denver, 1947, which will determine future plans and policies of our organization, is the ratification or rejection of the proposed amendments of the Articles of Incorporation and By Laws. With this fact in mind, I solicit pre-convention study and discussion of the proposed revision (see March AJMT) and advise that your delegates be instructed accordingly.

It is with genuine pleasure that I anticipate meeting you in Denver.

Sincerely,

MARY F. EICHMAN, M.T. (ASCP)

ANNOUNCEMENTS

The meetings of the A.S.C.P. and the Board of Registry, scheduled for May in Atlantic City, have been canceled and those members will not convene until October. Their meetings will take place at the Hotel Drake, Chicago.

Miss Barbara Tucker, Northwestern Hospital, Minneapolis, Minnesota, has been appointed to complete the unexpired term for the counsellor from that district.

TO DELEGATES WHO ATTEND THE MEETING OF THE HOUSE OF DELEGATES, JULY 1, 1947: Please bring your March, 1947, AMERICAN JOURNAL OF MEDICAL TECHNOLOGY, with you, so that you will have a copy of the proposed revision of the Articles of Incorporation and By-laws.

Just a note from the editor: The AMERICAN JOURNAL OF MEDICAL TECHNOLOGY for July, 1947, will be delayed in reaching you. Much of the copy from that issue will be concerned with reports from the annual convention. This means that the usual deadline will not be observed, and there will be a parallel delay throughout the process of getting the journal ready for publication.

EDUCATION COMMITTEE

Below is a list of the slides available in the loan sets on hematology. For further information and to make application for the use of a set, write to Miss Hermine Tate, Executive Secretary, A.S.M.T., Medical Center Bldg., Lafayette, Louisiana.

Loan Sets Available in Hematology

Slide 1. Erythroblastic anemia
Slide 2. Sickle cell anemia
Slide 3. Post hemorrhagic anemia (marked red cell pathology)
Slide 4. Acute monocytic leukemia
Slide 5. Chronic myelogenous leukemia
Slide 6. Acute lymphatic leukemia
Slide 7. Chronic myelogenous leukemia with a preponderance of basophils
Slide 8. Acute myelogenous leukemia
Slide 9. Chronic lymphatic leukemia
Slide 10. Possible Hodgkin's disease. (Red cells demonstrate Howell-Jolly bodies as the patient had a previous splenectomy to clear symptoms of hemolytic jaundice.)
Slide 11. Hemolytic jaundice
Slide 12. Chronic myelogenous leukemia
Slide 13. Vivax malaria
Slide 14. Pernicious anemia
Slide 15. Pernicious anemia. (Red cells demonstrate reticulocytes)
Slide 16. Pernicious anemia
Slide 17. Lead poisoning
Slide 18. Myelogenous leukemia. Smears made at onset of disease
Slide 19 Ovalocytosis
Slide 20. Multiple myeloma. Red cells demonstrate rouleaux formation
Slide 21. Leukocytosis. Many neutrophils reveal toxic granulation
Slide 22. Infectious mononucleosis
Slide 23. Treatment case of possible myelogenous leukemia. The patient responded to transfusions. Smears were made to demonstate the nucleated reds.
Slide 24. Anemia (not classified) 41% reticulocytes.

For further information regarding the six weeks parasitology course offered by the U.S. Public Health Service, through Dr. Seward E. Miller, Chief of the Laboratory Division, at the Communicable Disease Center, 291 Peachtree Street, N.E., Atlanta, Georgia, please write the Chairman of the Education Committee,

Miss Rachel Lehman, 3939 North Capitol, Indianapolis, Indiana. The next course begins on July 7, the following one on October 6. Below is the tentative outline of the six weeks of instruction:

First Week	LABORATORY DIAGNOSIS OF INTESTINAL PARASITES	DIAGNOSIS OF INTESTINAL PROTOZOA (Amoebae, flagellates, cultivation and concentration techniques).
Second Week	With special emphasis on:	DIAGNOSIS OF INTESTINAL PROTOZOA AND HELMINTHS (Ciliates, coccidia, nematodes, staining and concentration techniques).
Third Week	Amebiasis Hookworm Echinococcosis Schistosomiasis	DIAGNOSIS OF INTESTINAL HELMINTHS (Cestodes, trematodes, and concentration techniques).
Fourth Week	LABORATORY DIAGNOSIS OF BLOOD PARASITES	DIAGNOSIS OF HEMOFLAGELLATES, FILARIAL WORMS, ARTHROPODS OF MEDICAL IMPORTANCE (Leishmanias, trypanosomes, filarial worms, arthropod vectors and staining of blood films).
Fifth Week	With special emphasis on:	DIAGNOSIS OF MALARIAL PARASITES IN THIN AND THICK BLOOD FILMS (Four species of plasmodia).
Sixth Week	Malaria Filariasas Leishmaniasis Trypanosomiasis	DIAGNOSIS OF MALARIAL PARASITES IN THIN AND THICK BLOOD FILMS (Malarial unknowns and finals).

COLORADO STATE SOCIETY OF MEDICAL TECHNOLOGISTS

Committees (local) for the annual convention of the AMERICAN SOCIETY OF MEDICAL TECHNOLOGISTS

General Chairman:
Miss Elizabeth O'Toole, 1345 Elati St., Denver.

Sisters' Reservations:
Sr. M. Thecla Murphy, Mercy Hospital, Denver 6, Chairman.
Rita Schneider, Nurses' Residence, St. Anthony's Hospital, Denver.
Lucille Brown, 2406 Downing, Denver.

Programme:
Pauline Kurachi, Colorado State Hospital, Pueblo, ASMT Chairman.
Clair Ewell, 762 Ash St., Denver.
Evelyn Lunn, 1164 So. Emerson St., Denver.
Janice Shaw, 1476 Pennsylvania St., Denver.
Mabel Uyeda, 2730 Downing St., Denver.
Florence Fields, Community Hospital, Boulder.
Neil Mahoney, Pueblo (Colorado Fuel and Iron Corporation)

Registration:
Virginia Wier, 1104 Republic Bldg., Denver, ASMT Chairman.
Margaret Miller, 1238 Jones Ave., Pueblo.
Grace Meade, 768 Colorado Blvd., Denver.
Lola Dixon, Childrens' Hospital, Denver.
Evelyn Pellillo, 1701 East 17th St., Denver.
Vivian Wall, 1035 Sherman St., Apt. 302, Denver.
Gertrude Morrish, 1010 E. 9th St., Pueblo.
Edna Mains, 2432 W. Argyle Place, Denver.
Evelyn Goodenough, 4305 Cahita Court, Denver.
Gladys B. Geraghty, 1534 Garfield, Denver.

Publicity:
Lavina White, 306 W. 18th, Pueblo, ASMT Chairman.
Sidney Fried, 1430 Vrain St., Denver.
Mrs. Mabel Stewart Miller, 756 Colorado Blvd., Denver.

Exhibits—Commercial and Scientific:
Rose Hackman, 848 Monroe St., Denver, Local Chairman.
Mary A. Fox, 661 Monroe St., Denver.
Mrs. Helen C. Menkel, 3733 Sheridan Blvd., Denver.
Janice Bagley, 129 E. 18th St., Denver.
Philip K. Baldwin, 1933 Pearl St., Denver.

Richard Lyles, 1375 Xanthia St., Denver.
Olive A. Moseley, 1125 Corona, Denver
Martha G. Hampel, 1522 Lafayette St., Denver.
I. S. Stephens, 941 Dartmouth Drive, Denver.
Louise Weidlein, Quarters 3, Box 6397, Fitzsimmons General Hospital, Denver.
Patricia Brennan, 2069 Birch St., Denver.
Katherine Matson, 995 Corona St., Apt. 5, Denver.
Maxine Mayo, 9 South Grant St., Denver.
Ada Neal, 1119 E. Colfax Ave., Denver.
Naomi Stark, 647 High St., Denver.

Entertainment:

Philippine Dixon, 2233 Albion St., Denver, ASMT Chairman.
Renee Allen, 1624 Grant St., Denver.
Ruth Herzberger, Colorado State Hospital, Pueblo.
Rita Morgan, 1550 Sherman St., Apt. 312, Denver.
Anne Johnson, 2316 South Ogden St., Denver.
Mary Alice Ries, 1010 East 19th St., Denver.
Ruth Robinson, 1661 Williams St., Denver.
Helen Hawkins, 637 East 8th St., Denver.
Janice Shaw, 1476 Pennsylvania St., Denver.
Norma Jean Stanton, 2060 Dahlia St., Denver.
Christine Wall, 801 East 11th, Denver.
Dorothy Weiner, 3800 East Colfax Ave., Denver.
Mabel Wenzel, 1407 East 11th Ave., Denver.
Mary Louise Gregory, 609 E. Colfax Ave., Denver.

Banquet and Luncheon:

Mary Dille, 1736 E. 17th St., Denver, ASMT Chairman.
Loretta Hamilton, 1736 E. 17th St., Denver, Co-Chairman

Welcoming Committee:

Eleanor Meek, 1264 Ogden St., Denver, Chairman.
Jane Bliss, 1010 East 19th St., Denver.
Hattie Friedman, 766 Downing St., Denver.
Marguerite Jenks, 1588 Adams St., Denver.
Aldula Johnson, 457 Elm St., Denver.
Myrna Kempf, 1312 Lafayette St., Denver.
Elizabeth Pursell, 2214 East 17th St., Denver.
Ruth Self, 3211 W. Hayward Place, Denver.
Dorothy Smith, 639 East 17th St., Denver.

Identification:

Phyllis Nagel, 736 Madison St., Denver, Chairman.
Elizabeth Huntzicker, 1316 Madison St., Denver.
Emma Martin, 756 Colorado Blvd., Denver.
Helen Tanaka, 747 Birch St., Denver.
Nancy Wahl, 821 Harrison St., Denver.

Speakers' Supplies:
Sr. M. Jena Hickey, Glockner Sanitorium, Colorado Springs, Chairman.
Jane Fletcher, Pueblo.
Virginia Gould, Pueblo.
Ruth Hagaman, Grand Junction.
Pauline Thomas, 1160 Sherman St., Denver.
Joan Gordon, 414 Eudora St., Denver.

Sign Committee:
Sarah Allene Wise, 1701 E. 17th St., Denver, Chairman.
Julia Billings, 1241 Lincoln St., Denver.
Esther Beneventi, 5055 W. 10th St., Denver.

Special Committee, Informal Reception, Sunday, 6-29-47, 5 to 8 P.M.:
Dorothy Latson, Nurses' Residence, St. Anthony's Hospital, Denver, Chairman.
Alice Edelen, 1119 Vine St., Denver.
Edna Haskett, 4150 Alcott St., Denver.
Alvina Henning, 2017 Hudson St., Denver.
Alice Holmgren, 1235 Cherry St., Denver.
Rose Marie Martin, 1234 Washington St., Denver.
Edith Pendleton, 648 Clarkson St., Denver.

Local Arrangements:
Elizabeth O'Toole, 1345 Elati St., Denver, Chairman.
Allyne Lawless, 3420 W. 30th Ave., Denver, Co-Chairman.

Programme Committee:
Pauline Kurachi, Colorado State Hospital, Pueblo, ASMT Chairman.

AMERICAN SOCIETY OF MEDICAL TECHNOLOGISTS

Fifteenth Annual Convention
Headquarters
SHIRLEY SAVOY HOTEL
Denver, Colorado
JUNE 30, JULY 1, 2, 1947

Monday, June 30

Presiding officer—Miss Pauline Kurachi, M.T. (ASCP), Pueblo, Colorado.

8:00 to 10:00 A.M.—Registration.

9:00 to 10:30 A.M.—Exhibits open.

10:00 A.M.—Invocation. The Right Reverend Fred Ingley, D.D., S.T.D., The Episcopal Bishop of Colorado.

Announcements

President's Message—Miss Mary F. Eichman, M.T. (ASCP), Philadelphia, Pennsylvania.

Welcome Address—E. R. Mugrage, M. D., Advisor of Colorado State Society of Medical Technologists, University of Colorado school of Medicine, Denver, Colorado.

10:45 A.M.—Title to be announced—Ward Darley, M. D., Dean of University of Colorado School of Medicine, Denver, Colorado.

11:30 A.M. to 2:00 P.M.—Exhibits open.

Presiding officer—Miss Edna Luneke, M.T. (ASCP), Grand Rapids, Michigan.

1:30 P.M.—"Hypoglycemia; Its Physiology, Laboratory Finding and Clinical Manifestation," Lee H. Leger, M.D., Diplomate Am. Bd. of Int. Med., Director of Laboratories, Assistant Professor of Medicine, University of Kansas School of Medicine, Kansas City, Kansas.

2:00 P.M.—"A Few Laboratory Gadgets," J. B. McNaught, M.D., Professor of Pathology, University of Colorado School of Medicine, Denver, Colorado.

2:30 P.M.—Panel Discussion—"Problems of the Medical Technologists," Conducted by Lall G. Montgomery, M. D., Chairman of Board of Registry, Muncie, Indiana; Mrs. Lucille Wallace, M.T., (ASCP), Bethesda, Maryland, "Professional Status"; Miss Henrietta Lyle, M.T. (ASCP), Columbia, Pennsylvania, "Salaries"; Miss Mollie L. Hill, M.T. (ASCP), Washington, D. C., "Working Conditions"; and Miss Cora L. Miller, M.T. (ASCP), Hampton, Virginia, "Time Off for Refresher Courses, Etc."

3:30 to 5:00 P.M.—Exhibits open.

3:30 P.M.—"Fluorescence Microscopy for Demonstrating M. Tuberculosis in Smears and Tissues," Frank H. Tanner, M.D., Pathologist and Director of Laboratories, Lincoln General, Byran Memorial, Nebraska Orthopedic and Lincoln State Hospitals, Lincoln, Nebraska.

4:00 P.M.—"Cholesterol and Basal Metabolism," Miss Lavina White, B.A., M.T. (ASCP), Pueblo Clinic, Pueblo, Colorado.

4:30 P.M.—See entertainment programme.

Tuesday, July 1

Presiding officer—Miss Eunice J. Reinhardt, M.T. (ASCP), Springfield, Illinois.

9:00 A.M.—"Poliomyelitis Convalescent: Throat Flora," Sr. M. Alcuin, OSB, M.S., R.N., M.T. (ASCP) collaborating with students of Medical Technology, College of St. Scholastica, Duluth, Minnesota.

9:30 A.M.—"Severe Erythroblastosis Fetalis Treated with an Exchange Transfusion: A Case Report," Sister Eugene Marie Carpe, S.C., B.S., M.T. (ASCP), Good Samaritan Hospital, Cincinnati, Ohio.

10:00 A.M.—"The Effect of Insulin on the Leucocyte Count," Elwood E. Baird, M.D., and Mrs. Philippine Dixon, M.T. (ASCP) Laboratory Diagnosis and Public Health, University of Colorado School of Medicine, Denver, Colorado.

10:30 A.M.—Panel Discussion—"Problems of Photoelectric Colorimetry," conducted by Miss Edna E. Mains, M.T. (ASCP), Department of Biochemistry, University of Colorado School of Medicine, Denver, Colorado; with Wayne H. Danielson, Ph.D., Clinical Chemist, Children's Hospital, Denver, Colorado; Miss Mary M. Pottner, M.T. (ASCP), Biochemistry Laboratory, University of Utah, Salt Lake City, Utah; Miss Licia G. Gambescia, B.S., M.T. (ASCP), Dept. of Biochemistry, Philadelphia General Hospital, Philadelphia, Pennsylvania; and others.

11:30 A.M.—"Parasitological Procedures for the Medical Technologists," Miss Dorothy Hitchcock, M.T. (ASCP), Michigan State College, East Lansing, Michigan.

11:30 A.M. to 3:00 P.M.—Exhibits open.

12:00 Noon—See entertainment programme.

2:00 P.M.—House of Delegates Meeting.

DELEGATES NOTE:

Bring March, 1947, *"American Journal of Medical Technology"* to Denver
so that you will have a copy of the proposed revision
of Articles of Incorporation and By-Laws.

Wednesday, July 2

Presiding officer—Mrs. Violetta Wakefield, M.T. (ASCP), Ft. Smith, Arkansas.

9:00 A.M.—Discussion "Meeting the Educational Needs and

Wants of Our Members," led by Miss Rachel Lehman, M.T. (ASCP), Indianapolis, Ind., Chairman of Education Committee, ASMT.

9:30 A.M.—"Stat, Please," Miss Doris H. Bradway, M.T. (ASCP), Norristown, Pennsylvania.

10:00 A.M.—"Genito-Urinary Infection, Bacteriologic Study of One Hundred Fifty Cases," Mr. Jack McKay, M.T. (ASCP), B.S., Genito-Urinary Surgery, Bacteriology and Experimental Surgery, University of Texas Medical School, Galveston, Texas.

10:30 A.M.—"The Use of Citrate-Gelatin Mixtures as Routine Blood Preservative for Blood Banks," W. O. Brown, M.D., Pathologist, Corwin Hospital, Pueblo, Colorado.

11:00 A.M.—"Improved Antigen for the Slide Test for Trichinosis," Mrs. Hazel Suessenguth, B.S., M.T. (ASCP), Mount Sinai Hospital, Cleveland, Ohio.

11:30 A.M.—"Penicillin and Streptomycin Sensitivity of Miscellaneous Bacteria and Fungi," Lida H. Mattman, Ph.D., M.T. (ASCP), Santa Rosa Hospital, San Antonio, Texas.

11:30 A.M. to 3:00 P.M.—Exhibits open.

Presiding officer—Miss Ruth M. Feucht, M.T. (ASCP), Chicago, Illinois.

1:30 P.M.—"Preliminary Reports on the Use of Cardiolipin Antigen in the Serodiagnosis of Syphilis," Miss Phyllis D. Shaw, M.T. (ASCP), Santa Rosa Hospital, San Antonio, Texas.

2:00 P.M.—"Rh Antibodies," Harold D. Palmer, M.D., Pathologist and Medical Director, and Miss Myrna Kempf, B.A., M.T. (ASCP), Children's Hospital, Denver, Colorado.

2:30 P.M.—Panel Discussion—Title to be announced on Serology, conducted by Miss Joyce Humphrey, M.T. (ASCP), Barnes Hospital, St. Louis, Missouri, with Miss Kathryn Aderhold, M.T. (ASCP), Oklahoma State Department of Health, Oklahoma City, Oklahoma; Miss Phyllis Shaw, M.T. (ASCP), Santa Rosa Hospital, San Antonio, Texas; and others.

3:30 P.M.—Title to be announced—Wray J. Tomlinson, M.D., Pathologist, Veterans Hospital, Fort Logan, Colorado.

4:00 P.M.—"Effects of Radiation Exposure on the Cells of the Peripheral Blood," Mrs. Edna Marks, M.T. (ASCP), Argonne National Laboratory, University of Chicago, Chicago, Illinois.

4:30 P.M.—"A New Technique for Counting Blood Platelets," Miss Ellen Skirmont, M.T. (ASCP), Argonne National Laboratory, University of Chicago, Chicago, Illinois.

5:00 P.M.—"Rabies—Natural and Experimental," E. R. Mugrage, M.D., Laboratory Diagnosis and Public Health, and Mrs. Mabel Stewart Miller, M.S., M.T. (ASCP), Instructor in Medical Technology, University of Colorado School of Medicine, Denver, Colorado.

7:00 P.M.—See entertainment programme.

THE ENTERTAINMENT PROGRAMME

Sunday, June 29

5:00 P.M.—Informal reception in the Lounge of the Lincoln Room. Hostesses: The Colorado State Society.

Monday, June 30

5:00 P.M.—Trip into the Foothills with "chuck wagon" dinner.

After the last paper on Monday afternoon buses will leave the Shirley-Savoy for beautiful Red Rocks Park where a dinner of buffalo, elk or both will be served outdoors. There will be music and entertainment by the "Men of the West." Wear your outdoor clothes and a warm coat.

Tuesday, July 1

12:00 Noon—Luncheon in the Empire Room.

This luncheon will honor the twentieth anniversary of the founding of the Registry. Dr. Lall G. Montgomery, Chairman of the Board of Registry, will be the speaker.

For those not attending the House of Delegates meeting may we suggest a mountain trip of your own selection or, in the evening, the Elitch Gardens Theatre or the Denver Symphony "Pops" concert?

Wednesday, July 2

7:00 P.M.—Annual Banquet.

The guest speaker will be Alex M. Burgess, Jr., M.D., Chief of Medical Service, Colorado State Hospital, Pueblo, Colorado.

One of the many features of interest for this evening will be the announcement of the awards for the best papers and exhibits by Dr. Philip Hillkowitz, former Chairman of the Board of Registry of the A.S.C.P. and first President of the A.S.C.P. An entertaining evening has been planned.

Thursday, July 3

8:00 A.M. to 12:00 Noon:

Buses will leave the Shirley-Savoy promptly at 8 a.m. for a tour of Denver's outstanding hospitals, Fitzsimmons General, Children's and the University of Colorado Medical School and Hospital.

Entertainment (to be announced later) is being arranged for the visting Sisters.

The Entertainment Committee sincerely hopes that those attending the Convention will call on its members for suggestions and help in arranging trips into the nearby mountains, to points of interest in the city, in locating restaurants and in any other way that might make your visit with us more enjoyable.

SCIENTIFIC EXHIBITS

1. "Improved Antigen for the Slide Test for Trichinosis," Hazel Suessenguth, Mt. Sinai Hospital of Cleveland, Cleveland, Ohio.
2. "Pathogenic & Non-Pathogenic Cultures—Mycology," Edith B. Hamilton, Receiving Hospital, Detroit, Michigan.
3. "Gallstones," Dorothy Gill, Mt. Carmel Mercy Hospital, Detroit, Michigan.
4. "Colorado Tick Fever," Mabel O. (Stewart) Miller, University of Colorado School of Medicine, Denver, Colorado.
5. "Manufacture of Allergenic Solutions & Methods of Skin Testing," Reva Levin, Chicago, Illinois.
6. "1946-47 Activities of the Harris County Society of Medical Technologists," Houston, Texas.

7-8. Colorado State Hospital (Two Exhibits), Pueblo, Colorado.

9. American Medical Association, title to be announced.
10. The Registry of Medical Technologists.

VONDELL STEWART, M.T. (ASCP),

Scientific Exhibits, Chairman,
St. Joseph's Infirmary,
Houston 3, Texas.

EXHIBITORS, TECHNICAL

Difco Laboratories, Inc., Detroit, Michigan.
Central Scientific Company, Chicago, Illinois.
A. S. Aloe Company, St. Louis, Missouri.
Ames Company, Inc., Elkhart, Indiana.
Kimball Glass Co., Vineland, N. J.
Photovolt Corp., New York, N. Y.
Ainsworth & Sons, Inc., Denver, Colorado.

CECELIA M. KORTUEM, R.N., M.T. (ASCP),

Technical Exhibits Chairman,
American Society of Medical Technologists,
1164 North Dearborn Street,
Chicago 10, Illinois.

ROSE M. HACKMAN, M.T. (ASCP),

4200 East 9th Avenue,
Denver, Colorado.

APPLICATION FOR HOTEL RESERVATION
AMERICAN SOCIETY OF MEDICAL TECHNOLOGISTS
Annual Convention, June 30, July 1, 2, 1947
Denver, Colorado

Please make hotel reservations noted below, and mail to Chairman of Local Arrangements Committee: Miss Elizabeth O'Toole, 1345 Elati St., Denver 4, Colorado.

The Shirley-Savoy is headquarters hotel. However, it will not be possible to house all delegates at this hotel. The other two hotels listed are located but one block from headquarters. Because of shortage of hotel rooms, there will be only a limited number of single rooms available, and we can therefore, assure delegates of better accommodations if they will arrange to share rooms, or be willing to be assigned a roommate by our housing bureau. Will one occupant of a room please make out this form and indicate name and address of other occupant(s).

If, after your reservation has been made, you find that you will be unable to attend the convention, please be sure to cancel your reservation directly with the hotel.

	Double Room (Twin Beds)	Double Room (Double Bed)	Accommodations 3 or 4 Persons to a Room or Suite
***Brown Palace Hotel—17th and Tremont	$6.60 to $8.80	$6.60 to $8.80	$ 8.80 to $17.20
***Cosmopolitan Hotel—18th Ave. & Broadway	$6.60 to $8.80	$6.60 to $8.80	$11.00 to $18.00
***Shirley Savoy—17th Ave. & Broadway	$3.50 to $4.50	$2.50 to $3.50	$ 6.00 to $ 8.00

Tear Off and Mail to
MISS ELIZABETH O'TOOLE
1345 Elati St.
Denver, Colorado

Number of rooms____ at the ____ Hotel, to be occupied by:

Name	Street Address	City	State

Type of accommodations ____

Would prefer a rate of $____ to $____, per person.

Date of Arrival ____ A.M. ____ P.M. ____

Date of Departure ____ A.M. ____ P.M. ____

Signed ____

Address ____

City and State ____

***Rates quoted are those in effect Feb. 10, 1947. These are subject to change without notice, according to OPA regulations now pending.

STATE AND LOCAL SOCIETIES

CALIFORNIA SOCIETY OF MEDICAL TECHNOLOGISTS

The first annual convention was held on May 2 and 3, at the Santa Monica Hospital, Santa Monica. The following speakers were on the program:

Dr. Alvin G. Foord, Pathologist, Huntington Memorial Hospital, Pasadena, will speak on "The Classification and Diagnosis of Anemias."

Dr. John F. Kessel, Chairman of the Department of Bacteriology and Parasitology, University of Southern California, will give the "Role of Mycology in Clinical Laboratory Diagnosis."

Captain Frederick W. Hindley, McCormack General Hospital, Pasadena, will speak on "Streptomycin."

Dr. S. Gordon Ross, Pasadena, will give "A Critical Evaluation of the Glucose Tolerance Test."

The organizational business meeting was open to all MTS (ASCP) in the state of California.

CHARLESTON (WEST VIRGINIA) SOCIETY OF MEDICAL TECHNOLOGISTS

Officers: President—Betty Frances Love, 1812 McClung St., Charleston; Vice President—Doris Boon, Charleston; Secretary—Dorothy Crawford, American Viscose Corporation, Nitro; Treasurer—Dessell Foy, Charleston.

Meetings held bi-monthly. This organization is local at present, but will be the nucleus for a state society. All registered medical technologists in West Virginia who are interested should contact the secretary for further information.

MADISON CHAPTER OF THE WISCONSIN SOCIETY OF MEDICAL TECHNOLOGISTS

This local society announces the program it has followed during the past fiscal year which in successive months has consisted of talks by Dr. Nels Hill, on the subject of "Electrocardiograms and Their Connection with the Laboratory"; Dr. R. N. Allin, on "Nephridites"; Dr. Harmon, on the "Basis of Science"; and Dr. W. A. Mowry, on "Allergies." At a dinner meeting in February colored movies of a Caribbean cruise were shown by Dr. Reginald Jackson, Jr. The meeting in March was a movie showing microscopic blood pictures.

MINNESOTA SOCIETY OF MEDICAL TECHNOLOGISTS

Annual Convention: Radisson Hotel, Minneapolis, May 15, 16, and 17. A Symposium on the Rh Factor was held on May 15 and 16, with the business meeting on May 17. In the afternoon of May 17, the program consisted of a meeting with allied groups of the Minnesota Hospital Association. At this time the prize winning papers of the second annual contest were read.

NEW HAMPSHIRE SOCIETY OF MEDICAL TECHNOLOGISTS

Officers: President—Eleanor E. Hoag, Hanover; Vice President—A. Frances Lewis, Concord; Secretary—Annie Clark, Huggins Hospital, Wolfeboro; Treasurer—Melvin Cooley, Claremont.

OKLAHOMA SOCIETY OF MEDICAL TECHNOLOGISTS

Annual Convention: Biltmore Hotel, Oklahoma City, May 3 and 4. The business meeting of the afternoon was followed by the informal dinner at which the guest speaker was Israel Davidsohn, M.D., F.A.S.C.P., Pathologist and Director of Laboratories, Mount Sinai Hospital; Associate Professor of Pathology, College of Medicine, University of Illinois, Chicago. His subject was, "Differential Diagnosis of Secondary Anemias." On Sunday morning, at a joint session with the Oklahoma Clinical Pathologists Association, Dr. Davidsohn spoke on the subject of "Determination and Interpretation of Anti-Rh Titer."

TEXAS SOCIETY OF MEDICAL TECHNOLOGISTS

The annual convention of the Texas Society of Medical Technologists was held in Houston, April 11 and 12, with the following scientific program:

"The Use of Nitrogen Mustard in Blood Diseases," by Robert Hettig, M.D., Baylor University College of Medicine, Houston.

"Analysis of Routine Clinical Laboratory Prothrombin Time Determinations in Dicoumarol Therapy," by Joseph H. Gast, M.D., Baylor University College of Medicine, Houston.

"Genito-Urinary Infections," by Jack McKay, B.S., MT (ASCP), Galveston, and Charles E. Edward, B.S., Gainesville.

"Penicillin and Streptomycin Sensitivity of Miscellaneous Bacteria and Fungi," by Lida H. Mattman, Ph.D., MT (ASCP), Department of Bacteriology, Santa Rosa Hospital, San Antonio.

"Determination of CO_2 Combining Power of Blood," by Nell McElrath, Ph.D., Department of Chemistry, University of Houston, Houston.

"Fecal Agglutinin Titration as a Diagnostic Aid in Enteric In-

fections," by P. E. Harrison, M.D., Baylor University College of Medicine, Houston.

"Rapid Differentiation of Bacillary Amoebic Dysentery," by W. M. Fisher, Ph.D., Baylor University College of Medicine, Houston.

"Diagnosis of Uterine and Cervical Cancer by Vaginal Smears," by Karl John Karnaky, M.D., Houston.

"Acute Hemolytic Anemia," by J. Morris Horn, M.D., Dallas, Texas.

"Preliminary Report on the Use of Cardiolipin in the Serodiagnosis of Syphilis in the Santa Rosa Hospital Laboratories," by Phyllis D. Shaw, M.T., Department of Serology, Santa Rosa Hospital Laboratories, San Antonio.

"Rh Subgroups (CDE) and Techniques of Testing," by Sol Haberman, Ph.D., Immunologist, Wm. Buchanan Blood Center, Baylor Hospital, and Assistant Professor, Department of Clinical Pathology, Southwestern Medical College, Dallas.

A style show, featuring laboratory coats, sponsored by a group of students and medical technologists from the Harris County Society, was the entertainment at a luncheon. A round table discussion of problems arising primarily in schools for medical technologists was led by Miss Mary Nagai, head technologist of Jefferson Davis Hospital Laboratories, Houston.

At the business meeting, a revised Constitution and By-laws were accepted, to conform with the Constitution and By-laws of the ASMT. The main points of revision were the embodiment of a stronger group of local and district organizations to be components of the state society. Membership in the state organization will be through membership in local and district societies. This plan for reorganization is to be completed by July 1, 1948. The fiscal year was changed to conform with that of ASMT. Standing committees will be appointed to conform with those of the ASMT. A strong membership committee will be made up of the second vice-president and the six members of the Board of Directors. This committee will be the advisory group which will assist in organizing those technologists in the more thinly populated portions of the state.

Officers elected were—President: Miss Vondell Stewart, St. Joseph's Infirmary, Houston; President-elect: Miss Lucile Harris, Hendrick Memorial Hospital, Abilene; 1st Vice-president (Program Committee Chairman): Miss Faith Wayne, 3306 Carpenter, Dallas; 2nd Vice-president (Membership Committee Chairman): Miss Estelle Boyd, 406 Lott St., Yoakum; Secretary: Miss Barbara Bickle, Harris Memorial Methodist Hospital, Ft. Worth; Treasurer: (elected 1946 for two year term) Miss Betty McGrew, 2002A Whitis, Austin.

A.S.M.T. ROSTER—Supplement

ALABAMA

Bush, Irene S.
Medical College of Alabama
Birmingham

Doolittle, Lillie
615 Medical Arts Bldg.
Birmingham 5

Howell, Ellen D.
State Hospital
Tuscaloosa

Knippel, Kathleen L.
3 College Street
Montgomery 6

Mason, Elizabeth D.
Box 142
Evergreen

Mullane, Drusilla
325 E. Magnolia
Auburn

Murphy, Madie E.
2030 Highland Ave.
Birmingham

ARIZONA

Del Giorno, Velma B.
311 E. Fillmore
Phoenix

Gavagan, Vivian H.
7 West McDowell
c/o Dr. L. D. Beck
Phoenix

Le Beau, Harriet E.
1032 East Osborn Road
Phoenix

Martin, Alice C.
820 Whitton
Phoenix

Tipton, Patricia
2240 East 7th Street
Tuscon

ARKANSAS

Jackson, Mrs. Eleanor K.
230 Pecan Street
Hot Springs

Socol, Helen H.
404 Bayles Street
Hot Springs

Van Wagner, Wm. H.
2401 Scott
Little Rock

CALIFORNIA

Angus, Graham
2201 Second Ave.
Los Angeles 16

Arneson, Valborg K.
Seaside Hospital
Crescent City

Barry, Nancy H.
E-34 Veterans Housing Unit
Pomona College
Claremont

Fanning, Helen P.
U. S. Veterans' Hospital
San Fernando

Fientje, Helen
St. Joseph's Hospital
Stockton

Galbreath, Jessica B.
c/o Dr. J. C. Galbreath,
Veterans' Admin. Hosp.
W. Los Angeles 25

Gilbertson, Margaret E.
656 W. Palmyra
Orange

Gardner, Gertrude
2561 W. 11th Street
Los Angeles 6

Haas, Marlys H.
St. Luke's Hospital Laboratory
San Francisco 10

Haden, Allie
Mercy Hospital
Merced

Haymond, Harold C.
Veterans' Admin. Hospital
San Fernando

Inouye, Mr. Tomoo
Good Samaritan Hospital
1212 Shatto Street
Los Angeles 14

Isbell, Barbara
Veterans' Adminis. Reg. Office
325 "F" Street
San Diego 1

Jackson, Edythe
2924 Eighth Avenue
Los Angeles 16

Miller, Barbara R.
606 So. Central Ave.
Glendale 4

Moncrieff, Mrs. Jesse S.
Paradise Valley Sanitarium & Hospital
National City

Oliphant, Mrs. Claire C.
4351 Utah
San Diego 4

Sheldon, Beatrice E.
St. Luke's Hospital Lab.
San Francisco 10

Sutherland, Vee C.
539 Wellesley Street
Palo Alto

Van Note, Helen B.
746 South Lake Street
Los Angeles 5

(Vetscher), Sister M. Frances
124 So. Airport
Santa Maria

Zitzmann, Elizabeth
383 Lola Ave.
Pasadena 8

COLORADO

Bliss, Jane E.
1010 East 19th Ave.
Denver

Gittings, Helen
2034 Dahlia, No. 4
Denver 7

Latson, Dorothy M.
St. Anthony's Hospital, Nurses' Home
Denver 4

Lunn, Evelyn I.
1064 South Emerson Street
Denver

Newcomb, E. Margaret
1010 East 19th Ave., R. 302
Denver

Pitanga, Marguerite B.
211 Fourth Street
Colorado Springs

Quinn, Frances
1370 Humboldt
Denver

Scott, Marilyn C.
1271 Clermont
Denver 7

Self, Ruth A.
3211 Hayward Place
Denver

Spahr, Catherine E.
1107 Arizona Ave.
Trinidad

Wall, Vivian D.
1035 Sherman, No. 302
Denver

CONNECTICUT

Coyne, Joan A.
1074 Wood Ave.
Bridgeport 4

(Furey), Sister Cecilia Mary
114 Woodland Street
Hartford 5

Girouard, Denise C.
Bridgeport Hospital
Bridgeport

Rowe, Catharine L.
New Britain General Hospital Lab.
New Britain

WASHINGTON, D. C.

Crowe, Virginia
Park Lane Apts., #618
Washington

Good, Mrs. Dorothy I.
1844 Mass., S. E.
Washington 3

Llompart, Hilda M.
5461—30th Place, N. W.
Washington 15

Rivera-Trujillo, Antonio
2334 Huidekoper Place, N. W.
Washington 7

Smith, Martha Agnes
1746 K Street, N. W.
Washington, 6

Thompson, Edwin C.
1512 Potomac Ave., S. E.
Washington 3

Wolford, Mary G.
1801 Eye Street, N. W.
Washington 6

FLORIDA

Bigham, Alethea I.
St. James Bldg., Suite 357
Jacksonville 2

Blum, William
309 E. Park Ave.
Tampa

Clement, Genevieve M.
402 N. W. 12th Ave.
Miami

Harrison, Cecile M.
P.O. Box 156
Bradenton

Lamont, Mrs. Anna M.
825 N. W. 75th Street
Miami 18

Stipe, Edith H.
1823 E. Alcazar Ave.
Ft. Myers, Florida

Wolfe, Lois G.
168 Sunset Ave.
Palm Beach

Wynne, Pauline D.
846 Brickell Ave.
Miami 36

GEORGIA

Barrett, Nell P.
924 Kings Court, N. E.
Atlanta

Brown, Evelyn
961 Melgs Street
Augusta

Cartwright, Sadie E.
2113 Bull Street
Savannah

Gordy, Martha C.
1510 Hilton Ave.
Columbus

Heyman, Elizabeth J.
1121 East 48th Street
Savannah

McQueen, Olive F.
P.O. Box 335
Emory University

Tilghman, Anne E.
Archbold Hospital
Thomasville

Welch, Margaret
37—13th Street, N. E.
Atlanta

Wight, Augusta
512 Grand Theatre Bldg.
Atlanta 3

IDAHO

Anderson, Della M.
Wallace Hospital
Wallace

Peacock, Audrey P.
122 N. Overland
Burley

Taylor, Catherine B.
1005 East Washington
Boise

Thompson, Margery M.
711 McKinley Ave.
Kellogg

ILLINOIS

Alschuler, Caroline
1765 East 55th Street, Apt. B-2
Chicago 15

Conrad, Marian E.
422 N. Kensington
La Grange

Davidson, Dorothy
2914 Edwards
Alton

De Boer, Grace A.
12 East 111 Place
Chicago 28

Ekberg, Anita
4202 Forest Ave.
Western Springs

(Forness), Sister M. Gilberta
St. Vincent's Hospital
Taylorville

Gibson, Shirley J.
1407 South 10th Ave.
Maywood

Goldberg, Burrill
1339 S. Harding Avenue
Chicago 23

Hay, Lois M.
Dun Donald Lane
Flossmoor

Hoffmann, Mrs. Lenora
203 S. 14th Street
Belleville

Johnson, Irwin H.
Box 37
Hines

(Kirstein), Sister M. Honorata
St. Anthony's Hospital
Rockford

(Kumpernas), Sister M. Evarista
St. Francis Convent
Springfield

Mail, Barbara G.
208 E. Cherry
Robinson

Moore, Helen W. Klug
607 N. 33rd Street
E. St. Louis

Pinkleman, Elizabeth A.
1402 Oak Street
Quincy

Porter, Elizabeth
1258 N. Seminary
Galesburg

Ratcliffe, Eleanor
Copley Hospital
Aurora

Robins, Eleanor
511 Belmont
Chicago 14

Senesac, Ruth D.
907 South 4th Street
Springfield

Spreitzer, Mary M.
336 Pine Street
Joliet

INDIANA

Charles, Marjorie R.
Dunn Memorial Hospital
Bedford

Hocker, Narcissa D., R.R.
Lizton

McDougle, Mildred L.
602 West North Street
Winchester

Robbins, Elizabeth
756 Grant Street
Gary

Roller, Gladys
8 North Street
Richmond

Smith, Wilma K.
534 W. Sycamore
Kokomo

Stoddart, Jean K.
3610 Balsam #4
Indianapolis

Stout, Eleanor R.
609 Hulman Bldg.
Evansville 18

IOWA

Bloom, Phyllis A.
Nashua

Bruns, La Vaun M.
Iowa Methodist Hospital
Des Moines 14

(Holtkamp), Sr. Mary Louis
1600 North Ash
Ottemwa

Wilson, Amanda G.
1105 Kimball Ave.
Waterloo

KANSAS

Jack, Pauline B.
203 South Vine
Caney

Karner, Louise H.
306 W. Forest
Pittsburg

Newberry, Neidra W.
Box 536
Kansas State College
Manhattan

Oberlin, Mary Elizabeth
625 Santa Fe
Atchison

Smith, Rose D.
2742 East Second
Wichita 8

Swinney, Bernice A.
Box 429
Lawrence

KENTUCKY

Alton, Oscar M.
2036 Tyler Lane
Louisville 5

Fabrizio, Angelina Maria
370 Aylesford Place
Lexington 22

(Kehres), Sr. Mary Julia
St. Anthony's Hospital
Barrett & St. Anthony Place,
Louisville

King, Peggy V.
Box 292
Barbourville

Luther, Dorothy L.
Christian Co. Diagnostic Laboratory
Hopkinsville

Muir, Katherine P.
1343 Cypress Street
Louisville 11

O'Bryan, Margaret R.
1107 Center Street
Owensboro

Peterson, Jo Nell
2101 Eastern Ave.
Covington

LOUISIANA

Birdwell, Arthur G., Jr.
413 Highland Ave.
Shreveport

Dalier, Elizabeth J.
2505 Banks Street
New Orleans 19

Daray Mary T.
811 East Boulevard
Baton Rouge

Davis, Doris W.
P.O. Box 152
Pineville Hospital
Pineville

Marshall, Mrs. Marie F.
5745 St. Anthony Ave.
New Orleans 19

Moak, Sara
3300 Prytania, Apt. 7
New Orleans 15

(O'Connor), Sr. M. Laurence
Schumpert Memorial Sanitarium
Shreveport 15

Parker, Irma A.
Box 117
Clinton

MAINE

Kangas, Vieno L.,
Central Maine General Hospital,
Lewiston

Withers, Georgene M.,
300 Main Street,
Lewiston

MARYLAND

Hantz, Henry A.
Washington County Hospital
Hagerstown

McFadden, Joseph F.
8507 Lynnbrook Drive
Bethesda 14

Menzel, Mrs. Nancy K.,
2900 Garrison Blvd.,
Baltimore 16

Schmidt-Sommer, Ilse
7827 Custer Road
Bethesda 14

MASSACHUSETTS

Dillon, Mrs. Rebecca I.,
26 Edgehill Road,
Brookline 46

Lepreau, Miriam B.
94 Hawthorn Street,
New Bedford

Smith, Kathleen N.
310 Park Avenue
Worcester 2

MICHIGAN

Bergdahl, Alice M.,
Dept. 72 (Nutrition Research),
Upjohn Company,
Kalamazoo 45

Bishop, Maud V.
740 Hazelwood, Apt. 7-D
Detroit 2

Brooks, Elizabeth D.,
1735 Seward D-3,
Detroit 6

Cooke Mrs. Mary C.,
Wm. H. Maybury San.
Northville

Ferry, Margaret W.
665 West Ferry
Detroit 2

Fretz, Ruth E.
487 Jackson Street
Petoskey

Harsh, Mrs. Clara H.
907 Pine Street
Marquette

Levin, Elinor
3951 Lawton Ave.
Detroit 8

MINNESOTA

Anderson, Marion J.
1765 Laurel Ave.
St. Paul 4

Banal, Sylvia
Box 463
Buhl

Broadwell, Ann N.
150 Bridge
Albert Lea

Coplan, Leah H.
2215 Glenwood Ave.
Minneapolis 5

Goyette, Bernice H.
Sildheim, Bald Eagle Blvd., W.
White Bear Lake 10

Lawrence, Loraine
181 W. College Ave.
St. Paul 2

Lee, Signe
416 S. 10 Street
Moorhead

Lorenzoni, Verna E.
3843 Blaisdell Ave.
Minneapolis

Olander, Margaret R.
1073 E. Orange Ave.
St. Paul 6

Sartori, Amelia A.
Buhl

(Schik), Sr. Mary Sylvia
Our Lady of Mercy Hospital
Alexandria

MISSISSIPPI

Bryant, Carol H.
718½ E. Fortification
Jackson

Craft, Mr. Cleo N.
Street Clinic
Vicksburg

Elmore, Gladys I.
544 Valley Street
Jackson 26

Mall Helen I.
434 Decille Street
Jackson 42

McConnell, Mercedes
Mississippi Children's Hospital
Polio Unit
Jackson

Means, Mary Golden
1912 Main Street
Columbus

Swoope, Martha M.
221 South Third Street
Columbus

Witte, Evelyn R.
103 East 2nd Street
Leland

MISSOURI

Carter, Jeannette S.
3506 Penn
Kansas City 2

Cone, Mrs. Evelyn H.
3505 A Watson Road
St. Louis 9

French, Mary E.
Menorah Hospital
Kansas City

Heinrichs, Thelma L.
3519 Arsenal
St. Louis 18

Jacobs, Marjorie B.
4232 Virginia
Kansas City 4

Jourdan, Mary C.
4162 Flad Ave.
St. Louis 10

Lacy, Audrey J.
3647 Blaine Ave.
St. Louis 10

London, Elizabeth
720 East Elm Street
Springfield

Read, Betty S.
3764 Chippewa
St. Louis 16

Schmidt, Rose Rita
325 N. Newstead
St. Louis 8

Tanabe, Eru
5182 Maple
St. Louis 13

Thierstein, Esther
1011 Corby Street
St. Joseph 19

Wheeler, Mary Esther
3335 Olive Street
Kansas City 3

MONTANA

Knapstad, Helena
25½ South Rodney
Helena

White, Sr. Mary Joachim
Holy Rosary Hospital
Miles City

NEBRASKA

Bloom, Margaret M.
4224 Woolworth Ave.
Omaha

Kubicek, Helen
Box 104
Fairbury

Lovell, Ellen B.
2015 Avenue "A"
Scottsbluff

McMahan, Dorothy G.
6700 Havelock
Lincoln 7

Tucker, Florence
Bryan Hospital
Lincoln 6

Welch, Jane S.
1225 P. Street
Lincoln 8

NEW HAMPSHIRE

Lewin, Lucile
65 Ridge Avenue
Claremont

NEW JERSEY

Arnold, Adele F.
27 Regional Drive
Penns Grove

Bates, Doris E.
1001 Shore Road
Northfield

Bonner, Eleanor J.
31 Holmes Street
Nutley 10

Bye, Carolyn N.
208 W. 6th Street
Palmyra

Gardner, Wilma P.
Middlesex General Hospital
New Brunswick

Madajewski, Dorothy S.
322 Fifth Avenue
Haddon Heights

NEW MEXICO

(Strassell), Sr. Charles Miriam
St. Joseph's Hospital
Albuquerque

NEW YORK

Beckman, Helen H.
13 W. 102 Street
Shanks Village
Orangeburg

Biniszkiewicz, Mary F.
605 Fillmore Avenue
Buffalo 12

Blockert, Mimi
312 West 82nd Street
New York 24

Elband, Bella
2101 Morris Avenue
Bronx 53

(Georgen), Sr. Teresa Marie
Mt. St. Mary's Hospital,
Niagara Falls

Harding, Virginia L.
V. D. Research Lab.
U. S. Marine Hospital
Staten Island 4

Lee, R. Josephine
11 St. Charles Street
Johnson City

(MacDonald), Sr. M. Ida
Mt. St. Mary's Hospital
Niagara Falls

Maitland, Barbara A.
130 W. Winspear Avenue
Buffalo 14

Rand, Marie C.
25 Ferris Lane
Poughkeepsie

(White), Sr. Mary Vincent
Mercy Hospital
Rockville Center
Long Island

NORTH CAROLINA

Hall, Miriam S.
412 Ethelind Avenue
Charlotte 4

Miller, M. Gaye
St. Joseph's Hospital
Asheville

Little, Evelyn L.
Wilkes Hospital, Inc.
N. Wilkesboro

Pully, Rose
Cabarrus Hospital
Concord

Reaves, Catherine A.
219 Boulevard
High Point

Sawyers, Mary J.
University Infirmary
Chapel Hill

NORTH DAKOTA

Van Camp, Sylvia
922 and St. N. E.
Minot

OHIO

Carroll, Margaret
125 East Market Street
Xenia

Wiechman, Robert C.
St. Elizabeth's Hospital
Dayton 8

Zimmerman, Gladys C.
Bethesda Hospital
Zanesville

OKLAHOMA

Crouch, Cora H.
717 N. E. 15th
Oklahoma City 4

OREGON

Mason, Marjorie E.
312 Guardian Bldg.
Salem

Reik, Mary S.
3545 N. Borthwick Avenue
Portland 12

PENNSYLVANIA

Ashley, Helen S.
605 Wood Street
Johnstown

Aye, Elizabeth
617 Hawthorne Avenue
Kittanning

Berkimer, Janice M.
247 Patterson Ave.
Butler

Caliguiri, Angeline R.
710 Broadway West Park
McKees Rocks

Celmer, Florence M.
4 Orchard Street
Glen Lyon

Daeufer, Mary
34 South 13th Street
Allentown

D'Alessandro, Henrietta R.
225 North 63rd Street
Philadelphia 39

Douglas, Ann E.
205 Beaver Street
Beaver

Drexel, Fern E.
343 North 6th Street
Reading

Farr, Eleanor V.
608 South Wilbur Avenue
Sayre

Force, Martha E.
359 Third Ave.
Phoenixville

Gildsmith, Emphia F.
230 North Duke Street
Lancaster

Grand, Gertrude B.
2345 N. Second Street
Harrisburg

Kane, Florence G.
4938 North 9th Street
Philadelphia 41

Knights, L. Winnefred
1612 West Fourth Street
Williamsport 22

Kunkle, Ruth M.
2129 Gordon Street
Allentown

Manges, Virginia B.
4946 Locust Street
Philadelphia 39

(Murphy), Sr. Clare Marie
Misericordia Hospital
54th and Cedar
Philadelphia 43

Schonwetter, Sara S.
154 Charles Street
Wilkes-Barre

(Schaffer), Sr. M. Aubrey
1020 Franklin Street
Johnstown

Strauss, Sofie
5101 North 15th Street
Philadelphia 41

Willenbecher, Muriel I.
440 N. 22nd Street
Allentown

Wittel, Rebecca T.
Wood Street
Florin

RHODE ISLAND

Batastini, Cleo H.
373 Academy Avenue
Providence 8

Yeaton, June T.
53 Stamford Ave.
Providence 7

SOUTH CAROLINA

Gettys, Mary Lee
428 Hampton Street
Rock Hill

Henry, Pharm. Harold L.
USN, Hdqs. Sixth Naval District
Medical Office
Charleston

Jessen, Charlotte
Lutheran Hospital
Hot Springs

SOUTH DAKOTA

(Raczkowska), Sr. Mary Fidelma
Holy Infant Hospital
Hoven

(Sullivan), Sr. Mary Mildred
St. Joseph's Hospital
Mitchell

TENNESSEE

Binns, Bessie M.
1628 Peabody Avenue
Memphis

(Laker), Sr. M. Henrica
St. Joseph Hospital
Memphis 7

Winn, Doris
1677 Beard Place
Memphis 12

TEXAS

Anderson, Margaret M.
904 Summit
Fort Worth

Barker, Enid L.
930 Anico Building
Galveston

Barkley, Willya L.
810 West 32nd
Austin

Berthier, Mary G.
Shannon Hospital
San Angelo

Blint, Helen
704 South 13th Street
Temple

Diefenbaugh, Lela M.
Kahn Memorial Hospital
Marshall

Hammond, Nance C.
Payne-Shotwell Hospital
Littlefield

Harlan, Julia E.
122 Watson
Marlin

Kavanaugh, Helen E.
P. O. Box 1011
Port Arthur

Koever, Koren
3105 Harris Blvd.
Austin

Miron, Marjorie M.
2915 Ave. O½
Galveston

Mattman, Lida
403 Arcadia Place
San Antonio

Russell, Ylena
Jefferson Davis Hospital
Houston

Sarver, Marguerite
Scott & White Clinic
Temple

Schultz, Elizabeth
904 South Sixth Street
Temple

Shaw, Phyllis
Santa Rosa Hospital
San Antonio

(Skoczek), Sr. M. Xavier
1600 Eleventh Street
Bethania Hospital
Wichita Falls

Urbantke, Elsie
1700 Palma Plaza
Austin

Ward, Mrs. Geraldine
4216 St. Emanuel
Houston 4

Warner, Margaret M.
2111 North Houston
Fort Worth 6

Wess, Julia R.
National Institute of Health
Seagoville

UTAH

Edelman, Sylvia
1234 East 1st South
Salt Lake City

Isaacs, Mary B.
Dugway Proving Ground
Tooele

(Mulligan), Sr. M. Helen Rose
Holy Cross Hospital
Salt Lake City 2

Simonsen, Winona V.
1453 Uintah Circle
Salt Lake City 5

VIRGINIA

Baptist, Sarah E.
4777 Washington Ave.
Newport News

Graff, Irma D.
111 Walnut Ave. S. W.
Roanoke 16

Gridley, Mary Frances
1801 N. Quinn Street Apt. 102-C
Arlington

Hawkins, Martha Elizabeth
21 East 39st Street
Richmond 24

Key, Mrs. Alice C.
Martha Jefferson Hospital
Charlottesville

Kohl, Virginia
Route 5
Richmond

McLain, Eleanor M.
Dept. of Public Health
Danville

Musgrave, Evelyn F.
33 North Fenwick Street
Arlington

Winsheimer, Daisy M.
634 74th Street
Newport News

WASHINGTON

Fuqua, Alice C.
219 Collum
Richland

Moss, Marjorie H.
7711 Forest Drive
Seattle 5

Reavley, Marian C.
716 W. Maxwell
Spokane

Roller, Mary E.
3726 South "K"
Tacoma 8

WEST VIRGINIA

Charleston, Ann B.
Wheeling Clinic Lab.
Wheeling

Foy, Dessell D.
No. 3 Walton Apartment
Charleston 1

Johnson, Marion T.
2779 Guyan Ave.
Huntington

Peterkin, Constance L.
1110 Ann Street
Parkersburg

(Rudolf), Sr. M. Borgia
St. Mary's Hospital
Huntington 2

Seguin, Janice C.
512½ McCorkle Ave. Apt. 1
South Charleston

Thompson, Sarah F.
Grace Hospital
Welch

WISCONSIN

Diederich, Sr. M. Mercedes
1324 N. Milwaukee Street
Milwaukee 1

Feverpfeil, Carol B.
7848 Eagle Street
Wauwatosa 13

Johnson, Betty L.
2320 N. Lake Drive
Milwaukee

McCloskey, Sr. M. Brigid
Holy Family Hospital
Manitowoc

Schumacher, Margaret A.
1332 North 64th Street
Wauwautosa 13

Stein, Lucylle E.
624 Sheldon Street
Madison 5

Wartenberg, Evelyn K.
3171 South Adams Ave.
Milwaukee 7

CANADA

Dupre, Therese L.
174 Jacques Cartier St. Jean-d'Iberville
St. Jean, Ontario

(Gauderdault), Sr. Marie Denise
Hospital St. Francois d'Assise
455 Piere Ave.
Quebec

Mailloux, Sr. Gabrielle
Hospital Saint-Charles
Saint-Hyacinthe, Quebec

HAWAII

Beatty, Marguerite L.
Bacteriological Laboratory
Department of Health
Honolulu, T. H.

Newtson, Rudolph W.
Lahaina Maui
Lahaina